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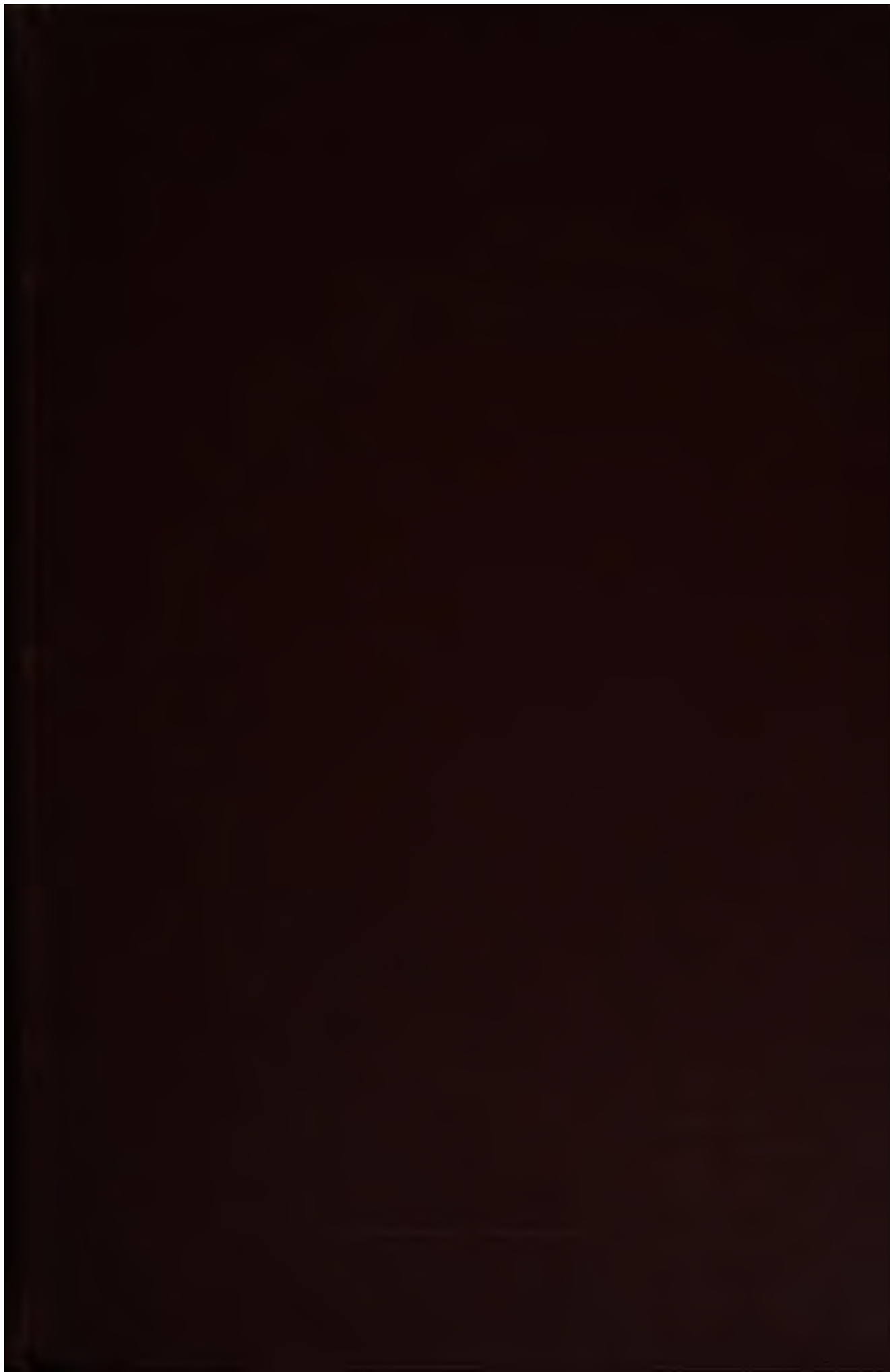
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FARMERS' REGISTER:

A MONTHLY PUBLICATION,

DEVOTED TO THE

IMPROVEMENT OF THE PRACTICE,

AND

SUPPORT OF THE INTERESTS

OF

AGRICULTURE.

And he gave it for his opinion, "that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together."
SWIFT.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

VOL. VIII.—1840.

PETERSBURG, V A.:

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1840.

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THE FARMERS' REGISTER.

VOL. VIII.

JANUARY 31, 1840.

No. 1.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

THE FOUR-SHIFT ROTATION, WITH PEA FALLOW ADDED. REMARKS ON OTHER MODIFICATIONS OF ROTATIONS.

To the Editor of the Farmers' Register.

Westover, Nov. 20, 1839.

In your last, or October No. of the Farmers' Register, you seem to raise objections to all the systems of farming as heretofore practised in Virginia. It is not my purpose upon the present occasion to discuss the merits or demerits of the different systems of farming as practised by our forefathers; that is most fully and justly done by yourself. But to present to your consideration a rotation of crops that I am about to adopt, and which has occurred to me to accord with your ideas upon the subject.

The principles of a proper rotation of crops as advanced by yourself seem to me to be in accordance with the most approved views upon the subject, and deserve the due consideration of every tiller of the soil, who wishes to profit by, and advance in, the theory and practice of agriculture.

I think it proper too, that I should assign my reasons for the abandonment of a system that I have practised unremittingly for sixteen years, and in good faith have recommended to the public.

I shall but briefly refer to the four-field and fallow system as heretofore practised by myself, as its merits have already been fully discussed, and subsequent experience confirms the opinions then entertained by me.

Believing as I still do in the many advantages that this four-field rotation possesses over the many as heretofore pursued in Virginia, I think it but proper that I should say a word in reference to the objections urged by yourself to it. This will be the more necessary also, as some of the objections there urged by you to it, are the basis on which the new rotation that I am about to recommend is founded. You object to it, first on account of its "severity;" secondly, from the "difficulty of following one-fourth of the farm every August and September for wheat;" and thirdly, from the "succession of the three fibrous rooted, narrow-leaved, exhausting grain crops, of wheat, corn, wheat."

To the two first of these objections, I cannot add my assent; but the latter has always been an objectionable feature with me; particularly the last crop in the succession, wheat following corn.

First then, as regards its "severity." I cannot think that you give to this fallow system its due, or that you attach sufficient importance to the extensive improvement it receives in the way of manuring. The cropping and draught from the earth is rapid and hard it is true; but at the same time the improvement afforded in return, is perhaps greater than under any other system as yet devised, when so great a profit is given. One-fourth of all the arable surface is annually improved by the best of all green manures (clover,) which receives its food from the atmosphere, and is returned to the earth as manure, and that at a season when its virtue is greatest, and when it is

in the greatest degree of perfection for improvement (August and September). It is the particular time at which it is turned under that I think its wonderful effects towards improvement principally consist. And in addition, the immense mass of materials that is afforded for the putrescent manures; which, under a tolerably well regulated farm should be sufficient to manure the entire arable surface once in every 8 or 10 years. So that one-third of the farm at least will be annually improved. The question then will be, whether the improvement thus afforded to the earth is sufficient to sustain the heavy draught of the three grain crops of wheat, corn, wheat? My experience goes to prove that it will more than do so.

In this calculation your clover should not be grazed off, and your ploughing and draining be well executed, as without it, no system can be improved to any extent and be successful. I cannot corroborate this assertion more strongly, or adduce a stronger argument to the contrary of its severity, than that my crop of wheat of this year, (under this system for the last ten years, and with its full share of cunch-bug,) averaged me 24 bushels to the acre throughout; that my crop of corn (with its full share of bug also,) will produce more than double what the same field did when I first cultivated it in that crop; and indeed that the entire estate will now double or treble its product when I first took it ten years since, and always under this system; and indeed, I can say, that I do not know of a farm where the system has been fully carried out, that has not improved under it, and that rapidly.

Second, as to the "difficulty of following one-fourth of a farm during the months of August and September for wheat." I have upon a former occasion stated that there was no operation on the farm that was performed with more ease and certainty than the following of one-fourth for wheat, during the months of August and September; longer experience does not change that opinion; and I must think the supposed difficulty more imaginary than real. My impression is, that it is one of the most valuable features in the system; it gives employment to our teams when they would have but little else to do at that season. The difficulty most generally consists in the misapplication of means. To attempt to turn under a clover lay at that dry season of the year with only two horses to a plough is utterly impracticable. A farmer who wishes to fallow at that season, with only three or four horses on his farm, should apply the three or four to one large plough. To this erroneous calculation, the difficulty is most generally attributable. A plough with only two horses, I consider insufficient at any season to turn under effectually a good clover lay. Whereas a good three or four-horse plough will in all seasons do it. And here, permit me to remind you of a failure at Coggins a few years since, from this very circumstance, attempting to fallow with two, instead of three or four-horses. I greatly prefer a four to a three-horse team at this season, as the leaders tend more effectually to keep the

plough in the earth of a dry season. A good four-horse plough will plough one acre a day, even in the driest season, and if the season is favorable, two acres with ease. I have ploughed as much as two and a half acres a day with one plough. It is moreover questionable whether a four-horse plough will not fallow more in a day (supposing the season a favorable one,) than two two-horse ploughs. The furrow slice of the former, will be nearly double of the latter, and then the obstructions from choking will be much less in the one case than the other. I will here remark, that this obstacle of the ploughs' choking, is greatly prevented by adding another block to the breast of the plough, thereby raising the beam. There is in truth, no operation on the farm that gives me less concern than fallowing; although unquestionably the most important. And in verification of this fact, my purpose is to enlarge instead of diminishing, my fallowing operations; all that you have to do to have it perfected, is to furnish good ploughs, a sufficient force to propel them, and undeviating instructions that they are never to stop unless the earth should be too wet. With these provisions and instructions the great difficulty is easily overcome. So easy and valuable is this feature in the system that I do not think I could be induced to adopt any in which I did not fallow for wheat at this season. You are not only so well remunerated for it, but it enables you to get in your crop with so much more ease and certainty.

I have asserted and still maintain that a good clover fallow for wheat will double in a term of years the same land in wheat after corn. My crops have more than done so, in the last 10 years. Now let us reason a little on the foregoing. This season I had 50 working days for fallowing, before the season arrived for seeding, say from the 12th August, to the 8th October; no deduction should be made for rainy days, as they accelerate instead of retarding the fallowing. Now, in these 50 days, a good four-horse plough would have fallowed 50 acres of land; this 50 acres seeded in wheat would have produced almost with certainty 1000 to 1200 bushels, and if a favorable season, more; but we will put it at its minimum, 1000 bushels; when the same land in wheat after corn would not on an average have produced more than 500 bushels. You will at once see that here was a clear loss of 10 or 12 bushels a day from not employing in this way, four horses, a man, and a boy, which must be necessarily kept on the farm at that season. So that I do consider that you lost the season above referred to at least 500 or 600 bushels of wheat, from not applying the four horses, which I saw attempting to fallow with two small ploughs and failed, instead of attaching the whole to one large plough, which could and would have accomplished it: for my ploughs on much stiffer and more difficult land to fallow did so during that time.* And I will here state, al-

* The very faulty and small operation (or rather attempt and failure,) referred to above, was not ordered or conducted by the proprietor of the land, and was not one of the numerous instances of bad management for which he was justly responsible. It was the last time that ploughs or teams so small as of two horses were used on that place to break grass land, either in summer or winter. Though three-mule ploughs only

though not as good land as that at Coggins, it nevertheless brought me upwards of 20 bushels to the acre. We will suppose the task a "difficult" one; can there be any employment of labor and capital from which so great a percentage is given, especially so, when wheat is the staple crop, as it is in this part of the state. I have heard it asserted that it would ruin any one to fallow at this season. Some of these very persons* I am pleased to say, now fallow with three and four horses, and double their crops from the same land. I have enlarged more upon this subject than I had intended, but it is one in which I feel the deepest interest, as I do sincerely believe the fallow system for wheat the only true basis for its successful cultivation.

Third, the "succession of the three fibrous rooted, narrow-leaved, exhausting grain crops of wheat, corn, wheat," has with me been the almost only objectionable feature in the system; particularly the last in the succession, wheat after corn. For wheat after corn, I think, can never be relied on for a heavy crop, unless it be on very rich land, and then rarely. I am satisfied of the fact from my crop of this year; my fallow field averaged me 27½ bushels of wheat to the acre, only from ploughing in a clover lay; whereas my corn land, every acre of which was both heavily manured and limed for the corn crop, produced me 15½ bushels to the acre, which by the by, was a good crop, and by far the best I ever made after corn. But my belief is, that with the same preparation under the system that I am about to adopt, it would have produced double that quantity. I should state that I last fall seeded only so much of my corn land in wheat, as was both manured and limed for corn. I am very certain that the remainder of the field if it had been seeded in wheat, although good land, would not have produced more than one-half, say 7 or 8 bushels; when the same land after fallow, would have produced from 20 to 30 bushels to the acre with almost a certainty. It will be but proper to state, that the whole of the corn land seeded in wheat was not accomplished in due time, one-half of it being seeded in November, and of course had not as good a chance; but the other half was seeded about the 20th October and should have yielded as much or more than the fallow, which had never been limed. But it did not, and this portion was no

have been there substituted, there is no doubt but Mr. Selden is correct when recommending four-horse ploughs, and good horses too, for the summer fallowing of stiff and deep soils; and that with a view to economy, as well as to good execution. But after making all due admissions, we still deem that the process of summer clover fallow, (when a regular annual operation for an entire shift, and to be completed under any circumstances,) must be sometimes a very laborious and difficult operation, even when conducted most skilfully, and with the best means and appliances.

ED. F. R.

* Dr. John Minge is one of the persons here alluded to. I am authorized by him to state, that he once entertained such an opinion; but that he is now convinced to the contrary. He states that this season his fallow field in wheat averaged him 26½ bushels to the acre; and his corn land only about 4 bushels; that is 93 acres of fallow produced him 2500 bushels good wheat; whereas 150 acres of corn land produced him little upwards of 600 bushels.

better than the last seeded; indeed I have seeded it first and at all times during the seeding season; still the same deficiency invariably ensues. How can it be otherwise when it succeeds the most exhausting grain crop that we cultivate?

Now, it may be very reasonably asked, why I am about to abandon a system that has improved my estate so greatly, and at the same time furnished so good a reward for my labor; embracing undoubtedly the two desiderata of profit and improvement to so great an extent? I must answer that it is with reluctance that I do leave it. But while we are doing well, why should we not do better? The system that I am about to substitute for the four-field and fallow embraces, I think, all of its good features, and discards its bad; as I will endeavor to show.

The system I am about to adopt, is a five-field and fallow system as follows:

- 1st year, corn,
- 2nd do. peas,
- 3rd do. wheat,
- 4th do. clover,
- 5th do. wheat,

I will first state that I have added another field of 100 acres of good farming land to my estate, thereby furnishing me with the requisite number of fields of 100 acres each; an arable surface of 500 acres.

The inducements then for the substitution of this five-field and fallow rotation, for the four, and the advantages (as I believe) resulting from it, are these:

That it will obviate the objectionable feature in the former, by breaking the succession of the three narrow-leaved, fibrous-rooted exhausting grain crops (of wheat, corn, wheat,) by the substitution of a leguminous, broad-leaved, improving crop, of peas, entirely a different one in all its qualities and properties; an alternative, preparatory, and improving crop.

That by adding the 100 acres to the arable surface, I am still furnished with the same desired number of acres for my grain crops, without enlarging or diminishing my former cultivation, and at the same time am enabled to overcome the objectionable feature in the four-field rotation.

That I believe it will increase my crop of wheat from 1000 to 1500 bushels more in consequence of its being seeded in this pea fallow, instead of its succeeding corn; after which I have never been able to average more than 10 or 12 bushels per acre, whereas I am very certain after a year's rest, and a good pea fallow, I shall be enabled to average from 20 to 30 bushels per acre.

That it will enable me to get in my wheat crop so much earlier, as I can commence following the peas in as soon as I have finished my clover fallow, not having to wait for the corn to mature, and then the tedious process of removing the corn, which has always retarded me so much as to make it about the middle of November before I can finish seeding. Under this arrangement, I think I can always seed my 200 acres in wheat in October, as I can commence on it sooner; and not having the corn to remove from before the ploughs, it will require mere draining. My fallow usually is seeded in 7 or 8 days, and the same number of acres of corn land, takes four times as long.

That it will enable me to lime my corn crop, and do my ploughing for corn always in the

month of November. As the corn will not be shocked on the wheat land, it can be gathered in as soon as you are done seeding wheat, having nothing to prevent; whereas from unfavorable weather you cannot run on the wheat, and you are delayed housing it until late in the winter, by which great loss is sustained. And as you will under this system, finish your wheat in October, you will have the good month of November to plough up your field intended for corn; thereby forwarding and securing both of these important jobs in their proper time.

That it will be a still more improving system, as there will be a less surface under exhausting crops; three-fifths only, instead of three-fourths; and two-fifths instead of one-fourth of the estate will be annually improved from green fallows; both fallows of the most improving kind, and turned under when in the greatest perfection for improvement. And as the mass of materials for putrescent manures will become greater, so will the estate be more largely improved by this means.

That the pea crop may be made a source of considerable profit not only by increasing the crop of wheat which will succeed it, (as I think,) at least 100 per cent., but by saving with your otherwise insufficient force a considerable quantity for sale; for if the rotation is a successful one, they will be in demand as much or more so than seed oats are now, (although strange to say every farmer almost makes oats;) and if not sold are of great value for stock. Your field may be also gleaned by your hogs, bees, and other stock that are to be fattened, before it is fallowed in for wheat. By which means they may be fattened much earlier, and at a great saving of corn, &c. That excellent farmer and great economist, Mr. Fielding Lewis, of Wyanoke, cultivated them extensively, and considered them of great value for feeding mules, &c.; if so, the crop will be of still greater value. The want of judicious economy on our farms is one of our greatest faults. Who amongst us considers broom corn seed of any worth? Yet to the north they are carefully saved and fed to stock.

That it carries out fully the principle of the alternating system of green fallows for wheat, after which they are so much more certain and profitable. The desired number of 200 acres is furnished me for the purpose, as more than that (which I should have if the whole 500 acres were in cultivation under the four-field rotation) my present force could not seed in proper time, and save, if good wheat.

That you are not of necessity forced to cut down, or to remove your corn at so early a period; but that it can remain in the field in its best situation until in order, and you are ready to house it. I lost this corn season from shocking it too green or too damp.

That it must effectually keep the estate clean by the frequent ploughings and successful spring cultivations, &c., and is destroying the obnoxious grasses and weeds, and thereby diminishing the food and habitations of insects, which are now so injurious to our crops.

That it will be decidedly a more convenient and better distribution of the labor, as you dispense with your wheat crop in the months of August and September and October. Your field intended for corn is ploughed in the month of No-

vember; and then you will have all of the winter and spring to plough at your leisure the field intended for peas. The field then being all ready you will have no further trouble or labor with them than simply harrowing them in, in May, after you are done planting your corn crop.

That the earth will be, from its being kept so clean, &c. in the very best state to receive the clover crop, there cannot be a question.

That where liming is carried on (as it is with me) the arrangement will be better, as frequently, from unavoidable circumstances, you cannot complete the field the first winter and spring, you can do so the second when it comes in peas. And then there is nothing that the lime will combine with better, and turned to greater advantage in improvement than with peas.*

These are some of the many advantages that have occurred to me as resulting from this change. Other alternating crops than peas might be substituted; such as vines of different sorts, pumpkins by far the most valuable of them all. I have known buckwheat, millet, and oats sown to be turned under as improvers. But I think none so cheap or possessing the same requisites as peas. They are in every respect an alternative, preparatory, and improving crop. Whereas the buckwheat, &c. &c. are of the narrow leaf, fibrous rooted family, drawing their food from the earth instead of from the atmosphere, and by their substitution the alternative system will not be effected.

As the oat crop is so valuable a one with me for feeding my teams, I propose seeding one-third of the field intended for peas in that crop; and on which I propose to put my manure. Should the manuring extend farther than the third for oats, I propose putting the remainder of the manured land in pumpkins; and the balance of the field of course in peas. The oat land will be fallowed up as soon as cut, and come in wheat with the remainder of the field in the fall. The land put in oats will be alternated as the field comes round for that crop, so that it will only be put in this exhausting crop once in every fifteen years.

You will perceive that by this arrangement of the field, you will be furnished with a greater variety of food for the stock; all of them of great value, and tending directly to the saving of corn; thereby enabling you to make that a larger sale crop.

I propose also having four lots for root crops and grass, of 3 or 4 acres each. Cultivating one every year in potatoes, turnips, mangold wurtzel, and carrots. The remaining three in grass as follows: 1st year manured and cultivated in root crops; 2nd. laid down in grass; 3rd. mowed and then grazed; 4th. mowed and grazed. Then alternated in the roots again. It has occurred to me that, by such an arrangement, a plentiful supply of the roots will be furnished for our winter consumption and for sale; a goodly supply of fine milk and butter; at least two tons of hay to the acre; and fine grazing for our mutton, bees, &c. &c.†

* The pea fallow is not a mere experiment with me, as I have frequently substituted them for clover, when that crop had failed; and from so doing derived great benefit from them. The tory or black pea is the best for the purpose that I have ever tried.

† I propose that the grasses shall be orchard grass and clover, sown together; as none suit our climate better, or afford better winter grazing.

Our attention unquestionably should be turned more to these things, to which we have never attached sufficient importance. We are yet far behind European, as well as the most successful northern practice in this respect. Judicious husbandry is undoubtedly the parent of plenty.

With the five-field rotation above recommended, a standing pasture will be necessary; a small one however for early grazing might be sufficient, as I have no doubt that it will allow the clover field to be grazed after it has well headed out, and might then be grazed to advantage; as by so doing each fallow field will have the advantages of being trampled, as it is supposed by many that the crops will be benefited by it, so that it will combine all the advantages of other systems in this respect.

Where a standing pasture cannot be provided, and the labor not commensurate with the arable surface, I have thought the following rotation would be a good one.

A six-field and fallow rotation.

- 1st year, corn,
- 2nd do. peas,
- 3rd do. wheat,
- 4th do. clover,
- 5th do. clover—grazed,
- 6th do. wheat.

Under this arrangement the second year's clover field would be the pasture. There might be these objections to it, that the fields might not be kept clear of the blue grass, &c.; and from being so trampled all the year as a pasture would be more difficult to fallow in the fall for wheat.

I am every year more impressed with the belief that our rotations should be so arranged as that our wheat crops should be on green fallows; and thus you see the principles of the above rotations are based. Experience, our safest and best guide, has taught the belief; and such I believe is the theory and practice of the most successful and best informed agriculturists upon the subject.

I now present the foregoing to your valuable consideration, and must ask to be pardoned for the allusions that I have made to my own cropping and improvements; and can assure you that it has been done with no disposition to boast on my part, as in truth there is nothing to boast of. But in doing so my sole object has been to show that the theories and opinions as here advanced, have been drawn from actual results. Whatever I have done towards the improvement of my estate, and a better course of husbandry, I hope is a mere beginning. The good work which I trust is in progress is not yet half done. In this age of improvement, when all other arts and sciences are rapidly advancing to greater perfection, why should not the humble tiller of the soil, who, I must admit, is far, very far, in arrears, make efforts to arrive at the same goal also? There is no profession more honorable and useful; in fact it is the fostering mother of the whole human race. A revolution however has undoubtedly taken place. Old habits and customs in many instances have been laid aside; the ball of improvement has been put in motion, and must accumulate. And let me assert that it has been mainly done through your agency. The weight thrown in the scale by your laudable and valuable exertions is great; but there is still much wanting to produce the equipoise. If what I have here said

has added a mite to it, I shall be happy in the reflection that I have at least performed a duty to mankind; and if I have been tiresome in the task, my apology must be, the zealous interest I feel in the promotion of my humble profession.

Your friend and obedient servant,

JOHN A. SELDEN.

ROOTS—NECESSITY OF OTHER PRODUCTS BESIDES INDIAN CORN FOR STOCK—IMPORTANCE OF JUDICIOUS ROTATION—FARMING IN ENGLAND.

From the Franklin Farmer.

Maplewood, near Lexington, }
Nov. 28, 1839. }

Dear Sir:—Much attention seems to be directed at this moment, in this state and elsewhere, to the importance of introducing some auxiliary crops, to supply certain qualities of nutriment, in which our old staples are deficient; and in case of a default of these, to stand in the place of substitutes for them. Those who have bestowed care upon any of the domestic races of animals, well know the advantage, summer and winter, of feeding, in part, with succulent food. The vegetable juices which it contains, seem to be as much relished by these animals, as the most savory gravies by their intelligent owners. That they aid in the preservation of health, is sufficiently demonstrated in the superior condition of animals which are fed upon them. The skin of these, soft and pleasant to the touch, is entirely free of scurf, and their hair, smooth and silky, shines with a natural oil. In this section of Kentucky, we are perhaps, as well supplied as any other portion of the union with this valuable description of food. The common rye, which is now generally used for winter pasturage, appears to be exceedingly nutritious, and stock of all kinds graze it with avidity; and we have besides, a wonderful resource in the beautiful blue-grass, which, like a mantle of charity from on high, covers our country, even in the bleakest weather, with an exquisite and delicious verdure. Rye and blue-grass, in fact, upon large farms, and when the season is propitious, are nearly all that the great farmer wants. But our fall and winter pastures, are not always equally good; snows are of uncertain duration; and many small farmers cannot allot a sufficient portion of pasture for winter use: and in all cases, especially where labor is more abundant than land, the cultivation of a judicious assortment of roots would well repay the farmer for any trouble and expense that it might cost. But another weighty consideration, which may be mentioned in favor of introducing the general use of roots as an additional farm crop, is, that from the different time of seeding and maturing it is very likely that the root crop would often hit when the grain would fail, and thus roots which are themselves sufficient for stock, without either other food or water, would rise in the scale from the second to the first place in the husbandry of years of scarcity. It is unnecessary to enlarge upon this topic. Experience has impressed it upon the minds of most of us, that small grain, in our climate, is precarious, and the annual variation of price, indicates but too plainly that even Indian corn, our staff and support, is not

absolutely sure to reward the farmer with a full return. During the present year, it is said, large droves of our stock have been sent to distant parts in quest of grain, and thus many farmers in the present season have not only lost the benefit of personal inspection and care of their stock, but besides, have been obliged to yield the great advantage they would have derived from the manure of animals stall-fed upon their own land. In the quality of manure, aptly called "the sheet anchor of agriculture," roots are fully equal to other descriptions of food; and the great quantity of liquid manure which they produce, tends greatly to hasten the decomposition of all the other contents of the farm yard.

Were it only necessary to find new crops to render the chances more promising of a full return, I think it not unlikely that the horse-bean would answer the purpose. It is greatly cultivated in England and France, and I have often seen it growing in our American gardens, with as much apparent luxuriance as it attains in the fields of either of those countries. In Europe it is of easy culture, being sown in various ways, either broadcast, drilled or dribbled. It is put in the ground about the time of sowing oats and hundreds and thousands of acres teem with the production of it.

Roots, however, are superior to this article for most of the purposes to which I have above alluded; and it is no doubt bad practice to multiply greatly the products of a farm, except when the condition of the land requires it. But admitting the fact, that the wise division of labor and the application of attention and means to one or a few productions is as essential in the conduct of a farm as in any other branch of human affairs, still, in different soils and exposures, different crops may be expected to succeed, and it is only by the success of the aggregate of a nation, that the horn of plenty is made to overflow.

Many farmers, unfortunately, have been deterred from the root culture or have abandoned it after insufficient trials. The chief difficulty attending it lies in the proper selection of roots. A very safe mode to determine which are the best in any particular situation is, to apply the touchstone of experiment and here we are greatly facilitated in our inquiries by the sister science of gardening. Our gardens, in fact, answer nearly all purposes of trial. In this section, for instance, I find by reference to my garden, that beets, carrots, and parsnips succeed best of the roots; that potatoes do well and that turnips are exceedingly precarious and could not by any means be relied on. The familiar volume of experience is therefore easily read and applied. But at this point, the investigation becomes confused and it is difficult to proceed. Among the numerous varieties of these roots, which are of the easiest culture and afford the greatest yield? What crops do they best precede and what should they be made to follow? These interesting inquiries cannot yet receive a satisfactory solution in Kentucky. When the root culture has been long practiced as a branch of agriculture, a new volume of experience may be compiled, containing the best roots and the best varieties of each root, for different situations. In this part of the union, the science is still to be ascertained and deduced from faithful experiments. Perhaps it may not be amiss to state that in foreign agricultural works, the mangel wurtzel is

maintained by many to be superior to the Swedish or any other turnip for farm purposes and that it is generally admitted to be better for a clay soil. That carrots, though the acreable product is not so great, as of the turnip, are thought to be the best food known for improving the wind and endurance of horses—that recent statements would seem to indicate that the sugar beet, the white variety of the mangel wurtzel, will answer well in many parts of our state.

In spite of a great desire to conclude this desultory letter, with your permission, I will cite as an example of the application of knowledge of the character I have been treating of the system of farming pursued in a fine farming district in England, which came under my personal observation during a visit I made that country in 1835-6. The district I mean is in Yorkshire, not very distant from the old city of York. The rotation of crops is admirably adapted to the soil and climate, and the stock which consume them, are selected with such judgement and so used, that they may, in fact, be said to labor in the immediate amelioration of the soil. Indeed I saw here, combined in an improved system of husbandry, the results of a most extraordinary success in culture and breeding, acting and re-acting upon each other. In Kentucky, we have always appreciated the skill which is applied in breeding and rearing fine varieties of stock, but we have, no doubt, generally been too indifferent to the importance of a judicious succession of crops. I think it was remarked by General Washington, that "any system in farming is better than no system;" and a Briton has truly observed, that a proper rotation of crops, "remedies all confusion, distinguishes and arranges the season and the appropriate mode of work, economises labor, reciprocates the improvement of both soil and stock, and forwards the interest of both landlord and tenant."

I am satisfied that no American could have seen with my eyes, without drawing the conclusion I did, that a good rotation of crops for the different sections of our country, is a subject of momentous importance. But to return from this digression. The practice pursued in the district I have mentioned, is called the Norfolk system, and depends for its success upon the alternation of green and white crops. From this circumstance it is called by some, "the alternate system." The most common rotation is the following, viz: turnips, barley, clover, wheat. But besides the principal succession of white and green crops, in continuing this system, a change is made for the purpose of resting the land, in the particular green and white crop used in each year, or otherwise the clover is suffered to remain for two years and is pastured instead of being mown. On the clay soils, in this district, liable to poach, the turnips are drawn and carted or the crop is omitted altogether and beans or some other substituted for it; but on sandy soils, they are fed on the ground to sheep folded upon them. On the latter description of land, a wonderful improvement is wrought, and it was upon such a soil, that I saw the greatest amelioration I ever beheld effected by judicious culture. It elevated very much the opinion I had formed of agriculture as a science. On one side of a hedge, I saw the finest crop of Swedes imaginable, the drills 28 inches apart, clean as a garden, and the turnips touching in the rows with scarcely an

omission. On the other side a howling waste of sand. This glorious field of turnips was produced by the rotation I have mentioned.

The preparation for the turnip crop is very simple. The drills are formed, and bones broken up in mills, are laid in them at the rate of from 15 to 25 bushels an acre. They are often mixed with ashes and distributed with regularity by a drill machine. The turnip seed is then sown on the top of the drill at the rate of three pounds to the acre.

When the roots are ready for use the tops are cut off and carried to the straw-yards to be consumed by cattle, and a small fold being formed of rope netting or hurdles, the sheep are introduced. These eat all the bulb, except the lower part, which is raised from the ground with a small prong and also carried to the straw-yards. The sheep are then removed to another part of the field and so on, till the whole is gone over. The kind of sheep which I saw used here were the new Leicester, a sheep of great bulk, which yields the much esteemed combing or long wool of England, but of which the mutton, to my palate, is coarse and rank. It is, however, a profitable sheep to raise, both for its wool and flesh, and I was informed, that those who were engaged in sheep-farming were more prosperous than most other farmers. The new Leicester mutton bears, in my opinion, about the same relation to the south-down or to our common Kentucky mutton, that the middling of the hog does to the ham, and perhaps might be useful here for the same purposes for which middling is used. However this may be, on a sandy soil the new Leicester sheep is a capital laborer. Besides the great value of his manure, which is equally distributed by the practice of folding, the land is very much improved by the tramping and packing and incorporation of the manure with the soil effected with his feet and which is called in one word the *management* of the land.

Besides being fed to the new Leicester sheep, the most artificial animal probably in existence, the turnips raised on the farm on which my observations were principally made, were also fed in considerable quantities to the admired short horn Durham cattle. When fed to these last they are given about at the rate of two or three bushels a day, together with straw or hay to each full grown steer.

The mode of farming above described, borrowed originally from those excellent farmers, the Flemish, would not entirely apply in this part of the state, but in many parts of Kentucky and the union, particularly on light sandy soils, the practice of a similar system would effect a great change and even here some of its principles might be used with advantage.

In viewing the many beautiful farms with which this district of Yorkshire abounds, that were once considered worthless, I was induced to believe that there is not so much difference in the intrinsic value of land, as is generally supposed. Some lands, deemed dead for useful purposes, in fact only lie dormant until the appropriate system is applied, when they begin to reveal a wonderful and unexpected fertility.

The introduction of the turnip, suiting as this root does her weeping climate and much of her soil has been of incalculable benefit to England.

It is now actually the case that lands formerly rented for shillings, now rent for pounds; and what were once barren wastes, are now among the most profitable soils for cultivation. Bones are conveyed from all parts of the world to the ports of that country; Brazil has furnished a good supply and even the United States have contributed to the crushing mills of Britain. I confess I have never seen an account of vessels carrying out bones to Europe, without feeling pained by the reflection that they were precisely the best manure for some of our own lands. I have sometimes looked forward with gratulation, to the day, when a regeneration shall be effected in certain parts of America by skillful agriculture; when those parts of the union, now deemed barren and almost worthless, shall rise in the scale and furnish their full quota of production. If turnips will not suit the soil and climate of the West, perhaps they would answer at the East; and who would not rejoice to see the sands of North Carolina, Virginia, New Jersey, Delaware and Maryland, covered with countless flocks of sheep, an animal furnishing as it does, both food and raiment precisely the best suited for a dense population! Who would not be pleased to see the manufacture of wool more extensively prosecuted and the fabric of American looms more generally used by a healthy, prosperous and happy population!

But the great change effected in the condition of England, and which might probably be wrought by similar means in some section of the Union, has been produced, like a magical delusion, by the use of an easy system, and is but one result of scientific agriculture. Happy the day, when the soil shall be considered, as in truth it is, a great *terra incognita*, full of wonders and pregnant with untold blessings to mankind.

I remain, dear sir, your ob't. serv't.

HENRY CLAY, JR.

ON THE MANURING OF ARABLE LANDS BY THEIR OWN VEGETABLE GROWTH.—ROTATION OF CROPS.

(Concluded from page 613, vol. vii.)

No. 4.

New schemes of rotations with green crops.

Indian corn being the great and most important crop in this country, and in this region more especially—covering as it does annually at least one-fourth, and oftener a third or more of the arable land—it is scarcely possible to devise a succession of crops which shall not cause corn to be immediately followed by wheat, or some other broad-cast grain (or white) crop. This objectionable succession is almost universal throughout this region, unless where the land is so poor, that to sow small grain would certainly cause more loss than profit. The succession is objectionable for several reasons already stated in the preceding numbers; but the strongest of them I suppose to be—not the mere coming together of two narrow-leaved, fibrous-rooted, grain crops—but still more because the corn rears insects which live to prey on the wheat. It is very desirable that this succession

should be broken, by finding some grass, or broad leaved crop, which can be interposed, and will occupy the ground the whole interval of time between the corn and the next grain crop. I have tried, for this purpose, the sowing of red clover at the last tillage of the corn, in June, and with great and general success, but never over the whole of the ground. Legions of minute insects were produced and fed upon the young clover, greatly to its injury every where, and, in some parts, to its entire destruction. But for this, there might have been obtained throughout, as there was in parts of the ground, a good and *clean* crop of clover, of full size and perfection of growth the year next succeeding the corn, and which would be ploughed under for wheat in August or September. Could the clover crop, so sown, be but rendered sure, its interposition would add a most important value to any form of rotation now in use. I hope that further experiments will be tried, and success found, perhaps in the later sowing the clover seed, and with some protecting crop, as oats or buckwheat, which possibly might serve to attract and divert the insects from the clover.

It is also desirable to fill up every portion of the growing season with some crop, which shall aid either in tillage, manure, or grazing. Corn usually ceases to draw from the land in August, and the land then is left idle, and suffered to get fouler, until in October, when ploughed for wheat; or until in February, if left for oats. If peas, or buckwheat, could be sown at the last tillage, in June or July, this interval might be profitably filled. A paper in the first volume of the *Farmers' Register* (page 345) states that a good crop of buckwheat has been thus raised and reaped at very little cost. If a good crop of buckwheat, (or peas,) thus made among corn, and succeeding its ripening, were ploughed under green, for wheat, it would do much to improve the succession of crops, even if wheat should follow, in the same year. And if wheat were not to follow so soon, rye might be sown in early autumn, or oats in spring, and either turned in for manure, to be followed by a broad-cast crop of peas sown in summer, and that again to be turned in for wheat in the next autumn. Three broad-cast crops, of kinds of plants so different, and each turned in before forming seeds, could scarcely fail to cleanse the land as effectually as possible, both of weeds and insects, and also to enrich it greatly. But whether the profit would exceed the expense, must be shown by careful experiment and a sufficient course of practice.

In Britain, the turnip crop is the most important in the rotation for improvement—the master-wheel in the machine. If eaten by sheep, on the ground where they grew, the root tillage and growth, and the dung of the sheep, together serve to improve the condition and fertility of the land, and prepare it admirably for the succeeding crop. I fear that turnips cannot be a like *meliorating* crop in this much drier climate. If they can, we would have a great advantage over England in this respect, that common turnips with us are sown in August, and ruta baga in July, but both late enough to come on land from which either wheat or oats had been reaped. In England, turnips require to be sown so early, and wheat is reaped so late, that both occupy the ground a whole year—while here both have full time to ripen in succession in the same season. Another great advantage we have

over Britain is the necessity which there exists for a whole year of rent being lost, once in five or six years at most, while the heavy labors of a complete summer fallow are executed, to precede wheat. The moisture of the climate there, which encourages the growth of weeds, and the want of a great tillage crop, like our Indian corn, to help to eradicate them, causes the necessity for summer fallow there; and the contrary circumstances offer no inducement or excuse for it here. For our summer fallow (so called,) is a totally different operation, and has benefits and effects altogether different. Now, for example, (and not to recommend the particular succession,) suppose that turnips were to follow wheat, as part of a rotation in England, (as they do in some good farming districts there,) and also in this country, let us see what could be the difference of manner.

In England, in four years there could be made but three crops, thus:

- 1st year, clover, (or last year of any grass)—
- 2nd " no crop, the land being ploughed from winter or spring, and through summer, for fallow, and wheat sown in autumn—
- 3rd " wheat—
- 4th " turnips—

In Virginia, the same succession and number of crops might be had in two years only, and the heavy and expensive labor of summer fallow be rendered unnecessary. Thus:

- 1st year, clover—ploughed under in August or September, and wheat sown in October—
- 2nd " wheat, followed by turnips, matured the same year.

This immense advantage which our climate offers, in rearing secondary crops, has never been profited by, and indeed has scarcely been thought of as a source of benefit. Being relieved of the necessity of naked or summer fallowing, we might keep our lands always producing or bearing some crop, except during the short times necessary for preparing for their seeding. And the more continually the land is thus kept occupied, not only is there the more of crops to feed and to sell, but, if properly managed, also the more of manure, the more complete the extirpation of weeds and insects, and by the absence of weeds, as well as by the frequent thorough ploughing, the better the tilth and the easier the tillage of the land.

Every person who has read extensively on the subject of rotations, and with the view of finding precepts to direct his own practice, has probably been disappointed in not meeting with any particular scheme of rotation suited to his own circumstances. The cause of this deficiency is most apparent, and the preliminary difficulties of supplying it would be perhaps the greatest to him who had most studied the subject. It is very difficult, if not impossible, to have any regular succession of crops on even a particular farm, which shall not be very faulty in some respects, or which shall not violate some of the important principles which have been laid down in the foregoing numbers. And even if that could be done for a particular farm, with full knowledge of its soil, climate, locality, markets, &c., it is manifestly impossible to prescribe any plan of succession of crops which shall be suitable generally. All that

can be done is to lay down the theoretical principles, which ought to be adhered to in practice as nearly as circumstances may permit—and to present examples of different rotations in practical operation, and point out their defects, as well as their advantages. Further—even if a scheme of rotation should appear before trial to be perfect, (for any certain locality and circumstances,) still, when tried, unforeseen objections might and probably would be found in its most desired and important parts. This is so certain, that it would be a sufficient objection to any new scheme of rotation, that its parts, which might be found objectionable, could not be changed, without a new arrangement of fields, or a general change of plan, which would cause great difficulty, and require years to bring about.

With these remarks, and excuses for errors in advance, I will presume to submit some schemes of rotations, which, though altogether untried in practice, seem to be free from the greatest objections to existing rotations, and to permit the operations of the benefits now deficient and required; and also, to be capable of being changed in particular parts, without necessarily changing the general plan, or arrangement of fields. The schemes being merely *supposed*, or suggested for experiment, I shall not refrain from naming particular crops, or processes, which are as yet altogether untried and of doubtful value, because in any such case, a substitute may be adopted if preferred.

Suppose, for example, a farm containing any certain quantity of arable land, besides a sufficient standing pasture on the most hilly, or wet, or poor parts of the farm. The soil of the fields of medium texture, not too light for wheat, nor too stiff for corn; either naturally well constituted, and thereby fitted to receive and retain improvement of fertility, from vegetable or other putrescent matters, or rendered thus fit artificially, by the application of calcareous manures.

If the plan of sowing clover among corn can be made as certain as this crop is as usually sown, then it would furnish a basis for a most admirable *three-shift course*, as follows:

- 1st year, 1. corn—clover sown in June, just after last ploughing.
- 2nd " 2. clover—first crop mown, except where top-dressed, and there grazed by hogs—
- 3. clover—second crop ploughed under in August or September for wheat, which sown in October—
- 3rd " 4. wheat—
- 5. secondary crop, peas, sown broadcast in July—to be followed next year by the recommencement with corn.

This gives five crops in three years.

The following substitutes would be permitted in this rotation: 1. If the clover, even though certain enough in general, (and upon this proviso entirely depends this scheme,) should sometimes fail in part, or altogether, (as sometimes will happen, even on wheat,) peas might be sown, and even be preceded by rye or some other green crop; so that the main object and benefit of a green manuring crop being interposed between the corn and wheat would still be perfectly secured, though at additional cost of seed and labor. 2. The pea crop of the third year might be made either a forage or a

manure crop, or partly of both, according to the wants of the land, or of the proprietor. 3. If deemed too costly, or for any other reason, this pea crop might be omitted, and then, without cost, it would be substituted by the usual volunteer growth of carrot-weed which follows wheat, and would be an intervening, though poorer vegetable manure crop for the corn crop of the next year.

A *four-shift* rotation might be made of the foregoing, adding, as the fourth year's crop, clover sown on the wheat of the third year. This would be

1st year—1. corn—

2nd “ 2 & 3. clover—first crop mown, second ploughed under green—

3rd “ 4. wheat—

4th “ 5, 6. clover, first crop mown, second ploughed under, dry.

This scheme gives six crops in four years.

The great objection to this would be the clover of the fourth year preceding corn, and nourishing insects to feed on the latter crop.

If the plan of sowing clover among corn cannot be relied on, then the ordinary three-shift rotation (of 1. corn, 2. wheat, 3. rest or clover,) might perhaps be relieved of its greatest defect, by sowing peas among the corn at the last tillage, and ploughing them in green, for wheat. This would interpose a broad-leaved leguminous manure crop between the two grain crops, and yet without separating them by more time.

A more extended, and seemingly better rotation (though still comprised in four years,) would be the following, provided green crops are certainly profitable to be ploughed under for manure.

1st year, 1st crop, corn—

2. secondary crop, peas sown broad-cast in June or July—

2nd “ 3. wheat (or partly oats)—clover sown—

3rd “ 4. clover mown—

5. clover turned in for

4th “ 6. wheat (and oats)—

7. secondary crop, peas broad-cast—to be followed by the return of corn again.

This rotation offers seven crops in four years, of which three are of grain, one of hay, and three of green manure. Perhaps buckwheat, or some other broad-cast crop, might advantageously vary the succession, by occupying part of the space allowed for peas.

In this last scheme, the reader may not immediately perceive that in its general plan it is nothing more than the four-shift rotation long known in one or another form. If the two secondary crops of peas (of 1st and 4th years) be omitted, the rotation becomes that heretofore in use on Curles', Shirley, Westover, &c., and described as the *four-shift fallow* rotation. If, in addition, the fallowing and the wheat crop of the fourth year be omitted, it is then the four-shift rotation of Col. Taylor. Thus, besides other substitutions which might be made, either of these changes may be made to any desired extent, without any alteration of the general plan or frame-work of the rotation.

The following scheme for a five-shift rotation, has also the great merit of permitting many changes in minor points, and substitutions of its crops, without altering the main features and plan of the succession. Its most obvious defect is, that

it has too many and successive green manure crops, and that its entire value rests upon the (perhaps yet doubtful) profit of manuring with green crops of annuall.

1st year, 1st crop, corn—and with its last tillage,

2. peas sown broad-cast, [or buckwheat on part,] and ploughed under, in autumn, and rye sown;

2nd “ 3. rye, ploughed under in blossom, to sow

4. peas broad-cast, turned under in autumn—[or, on part, rye not sown, and the ground used for vines and early planted roots;]

3rd “ 5. wheat, [or part in oats]—clover sown—

4th “ 6. clover, mown—

7. do. turned in, to precede wheat;

5th “ 8. wheat—

9. secondary crop, peas sown broad-cast, [or part in turnips, and late planted Irish potatoes.]

This scheme offers 9 crops in 5 years; that is, 3 crops of grain, 1 of clover hay, and 4 crops of green and 1 of dry manure. The last one, the peas in the fifth year, may be made a forage instead of a manure crop, if desired. Early planted roots and vines, to any extent desired, might be substituted for part of the corn crop; and late planted roots for part of the secondary pea crop in the fifth year.

If the frequent recurrence of green manure crops be objected to, it is easy to omit or substitute them, without affecting the general plan of the rotation. Thus, if a part of the field be too poor to bear a good and profitable crop of broad-cast peas or buckwheat, for green manure, in the first year, then that crop, and even the rye and the peas of the next year, might be omitted, and the land suffered to cover itself with the cheaper manure of annual weeds instead, which would be ploughed under in autumn for wheat. The crop of mere weeds, thus interposed between the corn and wheat, would still be an improvement upon the usual course, of the one grain crop following the other immediately. In this case, more labor would be required to plough for sowing wheat, but the crop would be so much better as to much more than compensate the greater cost. So the secondary pea-crop of the fifth year, may be omitted on poor land, and its place will be cheaply if not more profitably supplied by annual weeds. And if the land be too rich to need so many manure crops, this crop of peas may be harvested as a forage and seed crop. Also, on the richest parts of the fields, one or more of the green crops, of the first and second years, may be harvested for forage, or partly grazed. Thus, the details of the rotation may be so much altered for different circumstances, that it may be made to suit the richest land, or the poorest, on which both corn and wheat can be profitably raised.

Another defect (at least according to the long established mode of thinking and cultivating in lower Virginia,) is that too little corn, or space of the land cultivated, (one-fifth,) is allowed for this now all-important, and on some farms, the almost sole crop. But this defect, (if it be one,) is greatly lessened by the quantity of food for stock provided in roots and green crops, which will serve in place of much of the corn now used. Further, the corn

crop should be as much favored as possible by the dispensation of the prepared and collected manures of the farm—and *yet not by their direct and full application to that crop.*

This branch of the subject will require some explanatory views, which I shall proceed now to offer.

When farm-yard or other highly putrescent manures, ready to act as food for plants, are applied to any crop, their main operation is to increase the stalk and leaf, or root, of the crop, much more in proportion than its seeds. It is therefore proper to let such rich manures give out their greatest supply of food to crops which are cultivated for their stalks and leaves, as clover, and green crops in general—or for their roots, as potatoes, turnips, &c. rather than for corn or wheat, of which the disproportioned increase of stalk and leaf is scarcely any benefit, and may be to the injury and loss of the grain. The great apparent increase in grain crops on spots made rank by heavy and recent manuring, is always deceptive. The far greater part of the increase is in the stalks and leaves; and the smaller early promise of grain is frequently cut off by the wheat being lodged, and the grain shrivelled; and the place of corn ears being occupied by the black fungus, which is the certain effect of a too luxuriant growth. Therefore, as far as convenient, the vegetable and animal manure of a farm should be given to the green crops in preference to the grain crops; and when of necessity laid on the latter, they should be so given as that their greater value is reserved for a succeeding green crop. Though the amount and value of farm-yard manure on clover (for example,) are greatly increased by its being thus converted to *clover-manure* for wheat, still its action is made more gentle, and it does not produce an undue proportion of straw in the following wheat crop.

With this view, and also for economy of labor, and a belief of greater effect in general, my favorite practice of applying unrotted barn-yard manures, as well as the better decomposed, has been as a top-dressing on clover, in the early part of its year of best growth, (or year after being sown.) There need be no fear of waste from evaporation, or exposure, if the manure is spread thinly and evenly, as last as carried out. The first rain carries all the soluble parts of the manure to the roots of the clover, and of course the enriching action is immediate. The growth soon covers and shades the solid and unrotted parts, and thereby hastens their becoming decomposed and soluble, and their consequent descent into the soil, and serving as food to the clover. If used for grazing for hogs, (after beginning to blossom,) or if mown, the profit of the manuring is partly reaped in a few weeks. If all the growth be ploughed under, the next crop of wheat has the benefit of the farm-yard manure in its increased product of green manure, and in that state is received so gradually, as to do no harm by causing disproportioned luxuriance of stalk.

If *coarse* manure be given to corn, whether ploughed under deeply or as top-dressing, the greater part of the value remains, undecomposed, for the wheat, and part even for the green crop following; and corn, being a *gross feeder*, is less likely to be hurt by the coarse manure.

The more of the land put in turnips the 5th year, so much the better for the succeeding crop of corn, which ought to have as much aid as possible.

If unrotted leaves be used largely, as top-dressing for wheat *only*, in winter, they will protect the wheat from cold, and the clover from sun, and give scarcely any *aliment* to the first, but more to the second, and perhaps still more to the next succeeding crop.

On either plan of rotation, the manures should be so applied as to give, as far as may be, their first effects to the green and root crops; of next choice, to the corn, and last of all, to the wheat.
E. R.

ON LIMING LAND.

From the Lexington Gazette.

Dear Sir:—Your letter has been received, asking my "experience in relation to the application of lime to land, for the improvement of the soil;" and as far as that experience goes, you are welcome to it.

In my different tours through Pennsylvania and New York, upwards of five and twenty years since, my attention was forcibly attracted by the lime heaps, and the whitened appearance of the fields, where it had been spread; and the result of my inquiries as to its effect on their crops, predisposed me so strongly in its favor, that I determined to adopt the use of it the first favorable opportunity. This occurred in the year 1824 or 5, when I first came in possession of a farm near the Natural Bridge, now in the occupancy of Thos. Wilson, esq. A lime kiln, containing by rough estimate 1,000 bushels, was sold to the highest bidder some time in the spring, and as soon as I purchased, I had it all hauled and deposited in one great pile, in the field in which I designed using it. This field, I had previously set in clover, but having preserved no memorandum, I am unable now to say whether this was spread the succeeding fall and turned in with the clover, or reserved for corn the following spring. This fact, however, made a strong impression on me, that where large masses of the rock lime had rolled down 10 or 15 feet from the pile, and there slaked on the clover, that so far from being burnt up and destroyed, as I anticipated, this presented by far the most vigorous and luxuriant appearance. I recollected, too, this was one of the poorest fields on the farm when I took possession—was thickly set with running briars, and much disposed to freeze out and the soil to run together during the winter. The liming corrected both evils; which, in addition to the highly beneficial effects of lime in the hands of my worthy neighbor, David Greenlee, induced me to continue its use, though, from necessity, more sparingly than I could wish. How far the heavy crops subsequently made by that most excellent farmer, Mr. Wilson, has been the result of his constant application of manure, and very judicious management, or to the previous applications of lime, I am at a loss to determine. I am, however, willing to ascribe them to both, knowing the permanent good effect of lime, and believing it essential it should be followed by the use of putrescent manures. I doubt not, indeed, injury instead of benefit, may, in some instances be the result, unless the use of lime and putrescent manures (or vegetable matter in some form) go hand in hand.

But, in reply to your first interrogatory—the "Mode of preparing lime."

The kilns for the burning of the limestone are variously constructed—some are temporary, and some of a more permanent character—such, for instance, as the kilns at Capt. Edmondson's, for the burning of the hydraulic lime; and I believe your enterprising neighbor, Col. Barclay, also, has one constructed for his farm, which will bear ten or a dozen burnings. But these are expensive and troublesome in their first erection, and probably not so well adapted to most farmers, as the more temporary and cheaper kilns. These, with the aid of our farming hands, can be built by a good mason in 5 or 6 days, at a cost of about \$5, capable of burning from 500 to a thousand bushels; which will require two hands, night and day, to supply fuel, for 5 or 6 days, and during this time, will consume 20 to 30 cords of wood. This, to me, and most of us living six miles from town, is only worth the cutting and hauling; and I have no hesitation in expressing the opinion, that most of us thus situated, can burn lime at a cost not exceeding 5 or 6 cts. per bushel; and in no way can we so profitably employ our labor in the winter season, as in cutting our timber (now rotting in great quantities through our wood-lands)—quarrying the rock, and burning it into lime. You ask for such incidental remarks as may suggest themselves—and I will here observe, that through Maryland and Pennsylvania—in the latter particularly—where farmers are much closer calculators of the cost than we are, they deem themselves richly remunerated for their trouble and expense, if they can procure lime *within 10 miles of them, at 25 cts. per bushel*. This fact speaks volumes in its favor, and needs no comment.

It will not here be inappropriate to say, there are several varieties of limestone, and the science of chemistry, in its course of rapid improvement, has taught us that all and every variety is valuable. Formerly it was thought that such as contained magnesia were "poisonous and destructive to the soil." But our modern lights have taught us that they are merely more caustic, and must be used more sparingly—or a longer time allowed for them to absorb the carbonic acid of the atmosphere, and thus become carbonated, or their causticity neutralized. There are, however, large quantities of the pure blue limestone throughout our valley, containing little or no magnesia, and those fearing its effects may use the other without fear—the magnesian limestone being generally of a yellow or brown tinge; though Professor Rogers, in his Geological Report, speaks of a limestone "of a dull greyish blue color, and coarse texture," which, on analysis, was shown to contain upwards of 33 per cent. of the carb. of magnesia; and, upon the same authority, it appears, the hydraulic limestone of this country contains upwards of 16 per cent.

2nd. "Mode of applying lime—quantity per acre, quality of soil."

Since residing on Buffalo, I have been compelled to use lime more sparingly and more by way of experiment—but my method has been, first to break up the ground, then to lay it off in squares of 16 or 20 feet, and deposit at each corner a peck or half a bushel, according to the quantity desired per acre, and after this has thoroughly slaked, which it will do in 10 days or a fortnight, to spread it with shovels as evenly as possible, and then to incorporate it completely with the soil by harrow-

ing and cross harrowing. In spreading, the sower's tact and judgment must be used in keeping well to windward, else the eyes will suffer much from the lime. The ground is now well prepared for the corn crop; and if from 30 to 60 bushels are thus applied, nineteen times out of twenty, the labor and expense will be repaid with 50 per cent. interest. The growth of the cornstalks will be more vigorous, the blades greener, and, what is more important, the ears larger and better matured. If applied in the same quantity to the wheat crop in the fall, this is less liable to be depredated on by insects, and will at harvest have a brighter straw, and will weigh heavier. Besides, it will come earlier to maturity, and is much less liable to injury from rust. The only advantage I perceive from first using it with the corn crop is, its better incorporation with the soil the first season.

The lands of Mr. Wilson, on which I first commenced the use of lime, are of the mulatto cast, and somewhat disposed to be gravelly; but on Buffalo I have principally applied it to my stiffest clay, with the view to destroy its too great tenacity; but my partial trials on lands more sandy, induce me to believe it is here it acts most promptly.

I am, however anticipating your third interrogatory—the "effect on crops since cultivated, and upon the permanent character of the soil."

As before remarked, the crops are manifestly improved, both in quantity and quality. As to the permanency of its operation I have no fear. I am informed by Mr. Wilson that on those parts of his farm, where it was most liberally applied in 1824 or 5, as stated before, its good effects are still very obvious; and doubtless this would continue for half a century, under his judicious application of vegetable manures, as the soil is more prepared to receive them, to combine with, and to *hold them fast*, as it were, for I know of no more appropriate expression. But the science of chemistry teaches us that *lime alters the very constitution of the soil* and that in sands, where barn-yard manure sinks or evaporates—it matters not which—where its good effects are utterly lost in twelve months, this may be so remedied by lime as to make it combine and "fix" the fertilizing properties of vegetable manure, for many years. We know too it acts mechanically as well as chemically, and this combined action will explain the paradox—that whilst it loosens a stiff soil it will give compactness and stiffness to a sandy one; and it is the best remedy, next to horizontal ploughing, for lands disposed to wash. Its action also, is very different, applied in its caustic state, or after a long period of exposure to the atmosphere. They become indeed almost distinct substances, and this will in some degree account for the discrepancy in the experiments made with lime. As *quick lime*, it should never be applied directly to the soil, unless where there is obviously an excess of woody fibre, or where undecayed roots abound. But made into a compost by mixing alternate layers of sod, or rich earth abounding in vegetable matter—or with leaves from the woods and unrotted straw, it will soon decompose them, and prepare a rich repast of food for our wheat or corn, if thus spread and incorporated with the soil where they grow. Should any of our farmers have "killed" their land by the caustic lime, or by an *over-dose of it* in its mildest state, they have nothing to do but to plough in a good coat of stable manure, and I will

insure them for the succeeding crop. But prudent physicians administer light doses "till they become acquainted" with the constitution of their patients; and until we become better acquainted with the constitution of our soil, I would advise my brother farmers, to give the lime in *broken doses*, and never to forget that lime alone cannot work miracles; but its use must be combined with the manure from our stables and barn-yard, and that thus combined, in many soils, it will double the product over that manured alone.

I should have remarked, in connexion with your second inquiry, my belief that lime acts most promptly in all chestnut lands, and such lands might soon be doubled in their value. This is the common growth in the neighborhood of Springfield, and though limestone makes its appearance every where, I suspect the soil is very deficient in the calcareous principle—Indeed we find this to be the case in the immediate neighborhood of Lexington, in the soil taken from the surface of the rock, by Mr. Graham, and sent to Mr. Ruffin for analysis, which proved it to be totally deficient; and this he showed was the case, by analyzing the soil in different portions of our valley. But in addition, Professor Rogers says—"In my former report, I attempted to remove the mistaken impression, that the land of limestone regions is already sufficiently imbued with calcareous matter, by appealing to the results of analysis; and I would now repeat the observations then made, as having been confirmed by further examination."* And this deficiency can be supplied both by lime and by that substance so well known in this county as marl. Neither can farmers err in applying lime wherever the sorrel grows, or the plant called cinquefoil, (or silk-lee,) and the calcareous principle in ashes will produce a like good effect. To such as feel an interest in the subject of calcareous manures generally, and their good effects, I would refer to an essay on the subject, by the able editor of the *Farmers' Register*.

But I fear I am becoming tiresome, and if you think so, administer this as I would lime—in broken doses. In concluding however, I must remark that "there cannot be any fact in practical agriculture more clearly proved, than the beneficial action of lime upon the soil of limestone regions, such as our valley."

Respectfully yours, &c.,

ROBT. R. BARTON.

To C. C. Baldwin, Esq.

REPORT OF THE COMMITTEE ON SWINE.

From the American Farmer.

To the New York State Agricultural Society.

Until recently, very little attention has been paid to the breeds of our farm stock; and pigs being considered an inferior species of domestic animals, have been the last to engage the attention of the farmer; and even at the present day in many districts of our country, the old unprofitable kinds of this animal continue to prevail.

* Should any still doubt this deficiency of calcareous principle in our soil, let him take a fair specimen to the very intelligent and obliging Professor of Chemistry in Washington College, and his doubts will soon be removed.

Indeed, systematic breeding, with a view to improve the form and value of the animal, may be said to have hardly commenced among us, the improvements which are perceptible, being rather the fruits of European than American skill.

A common error in this country, has been to regard more the size of the animal, than its symmetry or good points; to estimate a breed according to the great weight which it could be made to attain—rather than the profit with which it would be fatted to the hands of the butchers—the most material point to farmer. But experience is teaching us a new lesson on this head. Butchers now judge of an animal, not according to its gross weight, but according to the good points, or most valuable meat, which it carries. Breeders have learned to prefer those which, with a given quantity of food, will lay on the most meat; and the consumer has learned, too, that meat that shows the most solid fat, is neither the most healthy, the most savory, nor the most economical. It is the due admixture of fat and lean, or the prevalence of what is termed *fat-lean*—such as is seen in the Devonshire ox and the South Down sheep—that gives the greatest value to the butcher's meat.

It was lately remarked by an eminent breeder of England, Mr. Gray, at an agricultural dinner, that he could feed on an acre of land, a greater number of pounds of mutton, in carcasses from 18 to 20 lbs. per quarter than in carcasses from 28 to 30 lbs. per quarter; and that a quarter of mutton from a sheep of 18 to 20 lbs. weight per qr. is worth more in proportion than from a sheep of 30 lbs. per quarter; and that consequently, the advantage is on the side of the smaller carcasses. And he assigned this, among other reasons, that in case of drought or scarcity, a small animal can collect as much food as a larger one, and having a smaller carcass it derives more advantage from it; that whilst the larger is losing in condition, the smaller one, if not improving, is remaining stationary; and when the period arrives at which an abundance of food can be obtained, it almost immediately reassumes its position, and is fit to go to market sooner than the larger animal.

These remarks are found to hold good in regard to swine, as well as sheep. The same quantum of food that will give 600 pounds to hogs of a very large breed, will fatten two hogs of 300 pounds each: and the meat of the latter, though not so fat, will be of the better quality. This, and other considerations, have given to what is termed the Berkshires, a decided superiority both in England and America, over most other breeds.

The history of the introduction of this breed among us, was stated in the report upon swine, made at the last meeting of this society. Since that time, the demand for this breed of pigs, from almost every state in the union, has greatly increased, and prices, in some cases, have almost exceeded credulity. Two hundred and fifty, three hundred, and even five hundred dollars a pair, have been paid for them. Nor have they been found deficient in weight, when they have had time to mature their growth. They have been fattened to weigh five, six, and seven hundred pounds; and one was brought to this market last week, from Fulton county, eighteen months old, purchased of Judge Buel a little more than one year ago, which weighed, when dressed, 633 lbs. the carcass of which sold in the market at about \$56.

But it is not the great weight which this breed of hogs are brought to, that gives them their great intrinsic value. They are docile, quiet, come to early maturity, have but little offal, give a large and excellent ham, one of the most valuable parts, sweet, sound and high flavored pork, and is believed, make as great, if not greater returns for the food consumed, than any other breed amongst us.

It is a matter of congratulation to the admirer of this breed of hogs, that Mr. Lossing of this city has recently imported three animals of this breed carefully selected by Mr. Hawes, in England. This, it is hoped, will prevent the necessity of breeding in-and-in, and thus preserve to us the breed in its purity.

In corroboration of the high opinion entertained of this breed of hogs, I will state, that Col. Williams, a spirited and wealthy gentleman, residing on Long-Island, desirous of procuring a superior breed of hogs, wrote to his friend and agent at Liverpool, to procure for him, *without regard to price, six pigs of the best breed in England*, and to take time and satisfy himself before purchasing. After diligent inquiry, his friend finally settled on the Berkshire, as being considered, taking all things into view, the best and most approved breed, and purchased seven, four males and three females, being the entire litter, (the owner refusing to sell a part,) and forwarding them to New-York, where they arrived in October last. One of the male pigs will be forwarded to the chairman of this committee in the spring, which will go still further to keep the breed from degenerating.

There are other good breeds of hogs in some sections of the country, each of which have their advocates and admirers, such as the Bedford or Woburn, Mackey, Leicesters, Mocho, China, Byfield and Grass-breed, as they are termed.

Much loss has been sustained by our farmers, in not keeping up the purity of blood, when possessed: the importance of which has been too little regarded, and before they were aware of it, the good qualities were lost, either by breeding in-and-in, or by crossing with inferior animals.

As regards the choice of hogs for breeding, it is recommended that the male should be small headed, deep and broad in the chest, the chine rather arched, the ribs and barrel well rounded, and the hams falling full down nearly to the hock. He should also be more compact in his form, and rather smaller than the females, for if she be coarse, her progeny will be improved in form and flesh by the cross, and the more roomy she is, the better chance will she afford of producing a large and healthy litter. Respecting her make, no other observation need be made than to choose her of a deep and capacious body with a good appearance, and belonging to as good a race as can be found.

The boar should be well fed, and when young, used sparingly. The sow should also be kept in good condition, so as to support her offspring, but should not be made too fat; for if in very high order she will probably bring but a weak and indifferent litter of pigs. She should not be allowed to farrow in the winter, as the young are then extremely tender, and of all animals the least able to endure cold, and thrive with great difficulty. The months of March and the first of April for the spring, and the months of August and September, for the fall litters, are therefore to be preferred for farrowing.

When the breeders possess a good kind of stock,

they are too apt to follow it up, by breeding what is termed "in-and-in" with the same family; a practice which is well known cannot be successfully persevered in, for they will become bad feeders, grow delicate, fall off in size, and almost entirely give up breeding; and should they casually have a litter, the pigs will be small, weak, and die almost as soon as they are born.

It not unfrequently happens, that a young sow will devour her young; she should therefore, be carefully watched, and well fed, when about to farrow: which may be known by her carrying straw in her mouth, about to form her bed. It is a good precaution to sponge the backs of the pigs immediately after they are born, with a strong infusion of aloes, in luke-warm water, as its bitter taste will prevent her from destroying them; care should also be taken before farrowing to separate her from other hogs. She should have a dry and warm place, and be provided with a good supply of straw cut short, to prevent the pigs from getting entangled, in which case she is apt to lay on and kill them. To protect the pigs, an open frame or strong rail on each side of her, elevated a few inches from the ground, under which the pigs may run, has been recommended. Eight or ten days after farrowing, the sow may be allowed to leave her sty for a short time every day, and when the pigs acquire a little strength, they may accompany her. A grass field is the best place, for the herbage improves the sow's milk; the pigs grow faster as well as more healthy, and the sty is rendered more sweet by their absence. If the brood be numerous, they should be lessened, in order to relieve the sow, to eight or at most to nine; though from ten to thirteen have been brought up in perfect order, without any apparent injury to the mother. In such cases, however, she should be a strong and healthy animal, as well as supplied with an abundance of the most nutritious food. During the whole period of her nursing, the offals of the kitchen, or dairy wash with ship stuffs, ground oats, barley, buckwheat or corn, mixed and given luke-warm, morning and evening, and with a little Indian meal or peas and barley ground and mixed, or something equally nutritious.

The young pigs, while sucklers, should not be left wholly to the nourishment offered by the sow, but should be furnished, two or three times a day, with skim-milk, or buttermilk-whey or pot liquor, made lukewarm, and having a little meal, shorts and boiled roots, mixed up with it; or if this be thought too troublesome, skim-milk, with a small quantity of meal may be left constantly for them, in a part of the sty to which the sow cannot have access. In six or seven weeks, they will generally weigh from thirty to thirty-five pounds and be strong enough to wean. After weaning, they should not only be kept dry and clean, but regularly fed.

The importance of the value of swine, with regard to the consuming of the refuse or coarse grain of the farm, and production of manure, is too well known to the farmer to require further notice.

Pigs that come in March, and are intended to be killed in December, should be well fed with the wash of the kitchen and dairy, from the time of weaning, and have a run in good clover where there is plenty of water, and as soon as peas will answer, a small quantity added to their feed daily, and the quantity increased as they increase in size;

as feeding and fattening hogs exclusively on corn, at the present high prices, it is evident to every one, would be a losing and ruinous concern. It is therefore recommended, that as soon as the harvesting of potatoes commences, the hogs should be confined and fed with boiled or steamed potatoes, with a few pumpkins, beets or carrots; and peas, oats and buckwheat, ground together, should be well mixed, when hot, and fed lukewarm, regularly three times per day. Great care should be taken not to cloy their appetites, by feeding more than they will eat at each time and as they advance, it is recommended to feed them a little at a time, several times in the day. To keep them easy and quiet, much depends on regularity, for they keep much better time than many are aware of.

To harden and give solidity to their flesh, about two or three weeks previous to their slaughtering, they should be plentifully fed with corn and pure water, but it would be more economical to have the corn reduced to meal, and if convenient made into mush pudding, adding a little salt by way of relish. A small quantity of fine charcoal thrown into their pens occasionally, and a small quantity of sulphur, mixed with the food, will add much to their health.

It has been ascertained that one bushel of grain ground and cooked, will go nearly as far as two in its whole state. The above remarks will apply equally well to grown hogs.

March pigs, well fattened, weighing from 200 to 250 pounds, and killed in December, will command in this market the highest price; but for consumption on the farm, an older and larger hog is recommended, say from 300 to 400 pounds.

Hogs treated as above, if of a good breed, will require from six to eight weeks to fatten them sufficiently for slaughtering.

C. N. BEMENT *Chairman.*

APPLICATION OF MANURES, AND THEIR EFFECTS. SHEEP.

To the Editor of the Farmers' Register.

Orange, December 17th, 1839.

My few contributions to the Register, have been upon the subject of manures, and my plan of endeavoring to fertilize therewith a much worn farm. The making of manures and their application, I acknowledge to be my hobby; and one I delight to ride. Therefore permit me to give you my proceedings in this important branch of the farmer's avocation during the present year.

In January last, all the manure that was of the proper description was applied as a top-dressing to the wheat. About the middle of March, the farm-pen manure, which was composed of straw, corn-stalks, weeds, leaves, and the droppings of the cattle, not being sufficiently decomposed to admit of turning in with the plough properly, was heaped; giving lime to the heap as the work progressed, which soon reduced it to the proper consistency, and adding greatly to the value of the manure; this was given to the corn land. The ashes collected, with plaster in the proportion of two parts ashes and one of plaster, was applied to our old meadows, at about four bushels to the acre; the meadow previously scarified by a heavy harrow,

the teeth of which made sharp and curved at the points; this produced a heavy crop. At present the ground being sufficiently firm, from the few days of freezing weather, all the manure collected since the spring is now being applied to the wheat, except a sufficiency of the most thoroughly rotted, for the garden. This being preferred, as the germs of the seeds of weeds, &c., are destroyed by the heat necessary to reduce vegetable matter to muck. The result of my applications of leaves from the woods turned in, is very satisfactory. And the grand result of my hobby is, "the gathering of two ears of corn, from land, which before I mounted my hobby, only produced one."

Though this branch of husbandry receives much attention, there are others affording me great pleasure and equal profit, viz: in 1834 I purchased 30 sheep at 10s. 6d.—is \$52 50. By referring to my sheep account, I find sales of wool at 40 cents per pound, independent of mutton and lambs consumed, net proceeds to credit of sheep \$262 70. Number of sheep counted to-day 40. The sheep when purchased were of no particular breed, and very indifferent; instead of selling my lambs at \$2 to the butcher, I select the best for breeders, thereby always having a young flock, and disposing of the old when mutton at \$4, besides gaining the yearly fleece, which is nearly equal to the price of the lambs. My flock at present is half Bakewell, which I prefer, in consequence of their fattening qualities, length of wool and heavy fleece.

My sheep have not had a bushel of grain, and no fodder except when snow prevents their getting grass. Their pasture is frequently changed; salt twice a week, reserving the best blue grass pasture, into which they are turned about the 12th of December; their shelter is a pine thicket. I never pen them, though their manure is a great temptation to do so, yet I believe it injurious, and they would more probably be stolen.

J. R. SPOTSWOOD.

REELING SILK.

From the Journal of the American Silk Society.

The ease with which the operation of reeling silk may be performed is not generally known; indeed, it is known to none but those who have tried their hand at it, and many even of them have got out of patience before discovering it. We have heard many anecdotes illustrative of the facility with which persons who never either reeled or saw it done. An aged gentleman related to us a few months since, the following: He had constructed a Piedmontese reel from the drawing and description in the Silk Journal, and placed it in a back room for the purpose of giving it a trial. He had carefully studied all the directions for the operation, and prepared himself to carry them out literally; after some difficulty he had caught the fibres of as many cocoons as he wished to combine in a thread, had got the two threads passed through the eyes of the plate, and even passed them around each other twenty times, as directed, before passing them through the guides of the traversing bar on to the bars of the reel. At last all this was ready. He looked at the cocoons, at the threads, *wound around each other*, and at the reel, with doubt and hesitation. "It will not do," said he, "surely those

threads wound around each other in that manner cannot pass freely—they must break with a very slight turn of the reel.” He at last ventured to touch the crank gently—the thread passed freely, and he was encouraged to turn a little faster, when it passed off still more freely. Thus encouraged, he turned the reel faster and faster, increasing by gentle degrees, till he put it upon full speed; and the faster he turned, the more freely the thread passed, and the more easily the cocoons unwound. He was so delighted with his experiment, that he called in his family to witness his success—for he had made the experiment in private, that he might not be exposed to the laughter of observers, in case of failure. He then proceeded, with the aid of one of his family, and reeled a skein of raw silk according to directions, and sent it to a neighboring city, where there was a person, a foreigner, who was considered a good judge of raw silk. The silk was shown to him, and he pronounced it *Italian raw silk* of excellent quality, and insisted that the skein exhibited, was reeled in Italy, and could not have been reeled in this country. After, however, he was assured that it had been produced here, and he was requested to point out any fault it might exhibit, he discovered that the thread was occasionally loose. That is, there were spots occasionally, in which the fibres remained unconnected by the adhesion of the gum. No sooner was this fault pointed out than the cause flashed upon the old gentleman's mind instantly. It was this. During the process the reel had been stopped occasionally for the purpose of replacing exhausted cocoons, &c. and when it was recommenced, he had omitted to wet the fibres below their junction at the crossing. The fibres at the point had of course not been brought into perfect contact, and had become dry; therefore, when they passed up and through the crossing, they of course did not remain adherent, and hence the thread in the skein presented those spots of loose or inadherent fibres—the perfection of raw silk requiring the several fibres to be closely united by their gum into a cylindrical thread. It was a valuable lesson to the old gentleman, although the trifling imperfection his silk presented in this respect, would scarcely have been noticed by the manufacturer; for there is not one skein of the best Italian silk in a hundred that is entirely free from that fault.

This anecdote, which is literally true, ought to encourage others to reel silk. The old gentleman is not a mechanic, and yet made the reel with his own hands. This shows how simple the Piedmontese reel is, and how easily it may be made by persons at a distance from places where they are kept for sale.

Another gentleman, who had obtained one of the iron Piedmontese reels that are made in this city, informs us that he is now using it, and that he is surprised at the facility with which the reelers, who never before saw a reel, nor the operation of reeling, perform with it.

Another gentleman, in Pennsylvania, has made a reel himself, of wood, though he is a worker in metal, of a construction different from the Piedmontese, but which produces similar results; with which he is also reeling his cocoons, and has produced some beautiful silk.

We could go on and fill our Journal with similar anecdotes and instances of success in reeling silk, by persons who had never before seen the op-

eration performed. But we deem the above sufficient. We could give our own experience, but this has been done an hundred times. When we learnt to reel, we had not the lights of the present time to guide us. Nearly all the publications on the subject were in French and Italian, which we did not read. But we found in Rees' Cyclopaedia, a description—a very imperfect one, of the Piedmontese reel. We employed a mechanic to make one with variations of our own suggestion. With this reel we began, encountering all the difficulties without any guide by which we could avoid them; and yet in one week we were able to reel with the utmost facility, and produced as good an article as we have since seen from any country. When the Congress Manual was published, we examined its directions for reeling—compiled, as is well known, from the best European authorities—and we were able to make many important corrections in our own practice—principally relating, however, to speed in reeling. We therefore, have our own experience as well as that of others for authority for saying, that any person of ordinary capacity and application can learn to reel in one week's time, so as to produce a perfect article. It will of course require practice to enable them to reel fast, so as to be able to reel as much silk in a day as an experienced reeler can; but it does not require as much even of this as it does for the performance of many kinds of every day work. For example. A young woman can learn to perform a full day's work at reeling silk in half the time it would require to learn to do a full day's work at spinning cotton or flax.

It is a common remark by persons who are going to raise silk, that they intend to sell their cocoons; and one of the most common questions asked of us is—“will there be a market for cocoons next season?” Nearly every body contemplates selling their cocoons. Now this is wrong. The producer of cocoons should also reel them for many cogent reasons—*first*, that he may obtain the profits of reeling, which he will find are nearly or quite equal to those of producing the cocoons. The highest price of a bushel of the best cocoons is \$6. This bushel of cocoons if properly reeled, will produce a pound and a half of raw silk of best quality, worth \$6 to \$8 per pound. But suppose it only worth \$5 a pound, there will be \$2 50 for reeling the bushel of cocoons. The reeling will furnish excellent employment for the females of his family, slave or free; or if he have none, or does not choose to employ them thus, for some neighboring female less fortunately situated than himself. *Secondly*, the reduction of the cost of transportation. Cocoons are very bulky, 25 to 30 pounds filling a barrel. If they are to be transported to any distance, the expense will be very great. They are also liable to accidents in transportation, such as indentation, which ruins them for reeling; putrefaction from confinement in close barrels, boxes, &c. While the expense of transporting the raw silk is comparatively nothing. A barrel of cocoons will be reduced, in weight, to three and three-fourths of a pound; and in bulk to the size of a half gallon measure, or even less; so that the raw silk of a hundred and fifty barrels of cocoons may be packed in a single flour barrel. These are reasons which we should suppose would induce all persons to reel their own cocoons.

But, say many persons indeed, the reeling of silk is too nice and difficult an operation for our

blacks to perform—we do not want the trouble of it. We have showed above that it is not so difficult to reel as is imagined. It is to be sure an art, and the perfection of its products requires nicety and some degree of skill; but all of which is easily acquired by any ordinary capacity. It is not the real difficulties of reeling that prevent any one from reeling; but the imaginary ones. Let any one determine that he *will reel*, and he *shall reel*, and that two in a time of apprenticeship that will astonish even himself.

There are some rules to be observed in reeling that we may as well lay down here while on the subject. They are generally found in the books, but so mixed up with other matter that they escape attention.

1st. The cocoons of each particular crop should be kept by themselves. Several parcels should not be mixed together; so that the age of all the cocoons of one parcel may be the same; for cocoons of different ages require water of different temperatures.

2d. The first thing in the morning, the reeler must select her cocoons, putting the best in one basket, second best in another, and the balance in a third.

3d. She must have clear rain or river water, and it is best, if it be river water, that it be placed over night to settle its sandy particles.

4th. She must acquire a knowledge of the temperature required by different cocoons, so that she will instantly know whether the water be too hot or too cold. There is no circumstance that causes so much bad silk as a want of this knowledge, or carelessness in applying it. If the water be too hot, the silk comes off in burs or ganglions, and when this is discovered, the cocoons already in the water are injured by the extraction of the gum, and the silk is thereby rendered uneven and knotty. If the water be too cool, the cocoons will rise up to the plate, and the fibres be broken. This is not difficult to learn.

5th. She should always know how long the cocoons have been produced, that is, how old they are; and in what manner they have been cured, whether *baked*, *steamed*, or *cured in the sun*, as all these require water of different temperatures. Very old cocoons require water nearly boiling, while those just produced and not cured requiring it little more than milk-warm. Baked cocoons of whatever age require water nearly boiling, while steamed cocoons require it of a temperature according to their age, and generally a little higher than those cured in the sun.

6th. Of whatever size the thread is to be, she must keep the number of cocoons regularly the same, or as near it as possible. If she is to produce thread of eight to ten fibres, she must begin with ten cocoons to each thread, and keep that number as steadily running as possible. She will not be able to keep the exact number, but she will never be obliged to allow them to vary more than two, so that the thread will be called "eight to ten fibre." This is regular enough for all practical purposes.

7th. After stopping the reel for any purpose, she must wet the thread thoroughly where it crosses, and thence down to the basin, by sprinkling it with hot water from the basin, before she begins again.

8th. She must change the water in the basin as

fast as it becomes foul—two or three times a day, when steadily at work.

9th. While the reel is going she must keep her attention steadily upon the cocoons in the basin, so that when one is exhausted or breaks she may have another ready to be added.

10th. The reel must be turned as rapidly as the cocoons will unwind, so that as little gum as possible may be left in the water.

11th. The person turning the reel must keep his eye upon the thread between the traversing bar and the bars of the reel, so that he may see and brush off any moths that may appear on it.

12th. Bear in mind that care and skill in reeling will make the silk worth two or three dollars a pound more than that produced by a careless reeler—therefore, that the careful reeler gets one dollar a pound for her industry, and two dollars for carefulness.

G. B. S.

SEARCH FOR CALCAREOUS MANURES.

From the Maine Farmer.

The subject of calcareous manures, although somewhat understood and prized in former years, has become more systematically understood on account of the laws which govern its action being more fully developed by the researches of Ruffin, the editor of the *Farmers' Register*. The publication of his work containing as it does a full code of the principles which should govern the application of lime, whether combined with clay in the form of marl, or combined with other materials, was an important event in the history of agriculture, and every farmer who makes the latest pretensions to skill in his profession, or has the least desire to be enlightened or to receive benefits from the experience of others, should read the work.

The Kennebec County Agricultural Society procured a number of them to be distributed in premiums, as they did not arrive quite in season they were not offered last spring but will be the ensuing year. In the mean time we would suggest to the trustees of the Society to procure more of them, and not only the trustees of this but every other agricultural society in the union. They cannot dispose of their funds in a better manner.

A five dollar bill will procure ten of them. And one of them bestowed in the form of premium, is worth more, and will do much more good and be of more lasting benefit, than the whole five dollars given in cash.

But to our subject. Chemical analysis proves that lime, either as a corrector of acids in the soil, as an improver of the texture of the soil on which it is put, or as a pabulum or food of a great number of plants, is almost constantly active in the process of vegetation; and an active and healthy vegetation is the farmer's "sheet anchor"—the foundation of his posterity and wealth. How necessary then it is that he enquire into this branch of his business, and look about him for a source and a supply of this mineral. Wherever there are limestone formations—or, in more common language, wherever there is lime rock, you will often find either a few inches immediately above the rock, or on one side, a dark colored layer of earth resting immediately in contact with the rock and varying in thickness. This is produced by a

disintegration of the rock, and is made of a mixture of carbonate of lime, and also *gault* of lime, or in other words lime united with the vegetating principle of the soil and other matters of different kinds. Our observing old friend, Major Wood of this town, once brought us a quantity of this from St. Albans, in this state, which was rich, in lime, and the other day he brought us a *half a bushel* by the way of specimen, which he collected not a stone's throw from his own door. Much of this contains not less than *fifteen* per cent of carbonate of lime. Now here is a substance containing all the elements necessary to promote fertility in soils that are lacking in these matters. All that is wanting is a little experience in the mode of applying, as it regards quantity, and sort of soil and crop. No doubt there are millions and millions of loads, sleeping undisturbed, in situations near where it is much needed. A little search will discover it, and a little exertion will get it out, and a little experience teach how to use it, and all these little items of knowledge will be of vast service to the farmer who puts them into active operation.

COMPARATIVE VIEW OF THE PROFITS ARISING FROM THE CULTURE OF CORN AND THE CULTURE OF SILK ON POOR SOILS.

For the Farmers' Register.

In the Farmers' Register (vol. vii. p. 599.) Dr. Perrine, after having avowed his belief in "*the fitness*" of the southern states for the culture of silk, uses the following language: "but this belief is not founded on the *false hypothesis*, that this new branch of rural industry will yield *greater profits* than an equal amount of labor and capital employed in the culture of corn or of cotton. Yet this belief is based on the *undisputed facts* that this new industry will occupy the *poorest* soils and the feeblest persons, which and who cannot be profitably devoted to the culture of any old staple of agriculture."

Now, while I avow a determined and firm opposition to all *humbug* statements, if the *hypothesis* that the culture of silk will yield *greater profits* than the same amount of labor and capital employed in the culture of corn or cotton (when *poor* soils are brought under cultivation in both cases) can be proved to be *false*, for one, I shall abandon the culture of silk, and advise others to do the same. But let us see how the matter stands, taking "*undisputed facts*" to form a basis for our estimates. I live in a region where corn is cultivated to considerable extent on soils that yield 10 to 12 bushels per acre, and none will pretend that this culture, taking 11 bushels of corn per acre as the average of the crops, will pay a profit of more than \$2 per acre; and if it does even that, it must be under a system of the most *pinching* economy. From this, it is obvious that the cultivators of such soils in corn, if *hired labor* were their dependence, could not live, and consequently they must emigrate, or sell their *poor lands*, and turn *speculators* or traders, and thus destroy the proper balance of society, by adding to a class already too numerous.

No. 1.

8 men, 3 boys, and 3 women, may cultivate 100 acres of *poor* land, and
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produce 1100 bushels of corn, from which 320 bushels must be deducted, for the support of 4 horses and 9 laborers; 780 bushels the remnant left for market, at 70 cents per bushel - \$546 00

Deduct as follows:

Hire of 3 men and clothing and animal food	\$210 00
Hire of 3 women and clothing and animal food	185 00
Hire of 3 boys and clothing and animal food	135 00
	\$480 00

Net profit (without charge for blacksmith's bill,) - \$66 00

From the foregoing statement it appears that 66 cents per acre, instead of \$2, would be the profit realized from *poor* soils cultivated in corn, and that this is near the truth, may be inferred from the fact that such lands, in this region, rent for 60 to 80 cents the *cultivated* acre.

No. 2.

8 men, 3 boys, and 3 women, may cultivate 30 acres of *morus multicaulis*, and with the assistance of \$150 expended for help, rear 2,000,000 of silk worms, which will produce 400 pounds of reeled silk, worth \$2000 00
And 200 pounds of floss and waste silk 100 00
\$2100 00

Deduct as follows:

Interest on cocoonery	\$75 00
Hire of 9 laborers as in No. 1.	480 00
Bread for 9 laborers	100 00
Corn for two horses	70 00
9 months interest on \$150	6 75
Transient labor	150 00
	\$881 75

Net profit \$1218 25

This may be a "*false hypothesis*," but if so, it rests mainly on the *admitted facts* of Dr. P., viz., 1. that 200 pounds of leaves produce one pound of reeled silk; and 2. that one acre of *poor* soil, planted in *morus multicaulis* will yield 8200 pounds of leaves, or 16 pounds of reeled silk.

In the last statement I have made no charge for reeling the cocoons, because, I *know* that it may be done by the 3 women, with the assistance of the men and boys. There is no difficulty about the art of reeling that may not be overcome by any woman capable of learning to spin cotton or yarn, with a few days suitable instruction, and two or three months practice. But if \$1 per lb. be paid for reeling the silk, we shall still have a net profit of \$818 from 30 acres of *poor* soil, or rather more than \$27* per acre.

LAYTON Y. ATKINS.

Stafford county, Va., Jan. 1840.

* Let it be remembered that I have made the product of 30 acres, 80 pounds of reeled silk, less than the estimate of Dr. P., which would add \$620 to the net profit.

**METEOROLOGICAL RECORD KEPT AT THE CO-
COONERY OF THE POTOMAC SILK AND AG-
RICULTURAL COMPANY.**

Location six miles N. E. of Fredericksburg, and four miles west of the Potomac. Latitude 38°, or nearly. Degrees measured by Fahrenheit's thermometer.

1839	Days.	Morning.	Noon.	Sunset.	Wind.	Remarks.
June.	10	71	84	77	N. W.	Clear.
"	11	64	87	82	Variable.	Do.
"	12	71	82	75	Do.	Rain with thunder in the morning, clear in the evening.
"	13	63	90	74	N. W.	Clear in the morning, rain in the evening with high wind, thunder and vivid lightning. Silk-worms spinning apparently undisturbed. Thunder storms do not kill silk-worms as some have imagined.
"	14	71	68	68	N. E.	Rain.
"	15	57	75	69	N.	Clear.
"	16	62	70	72	N. W.	Do. Two-crop silk-worms hatched on the 10th, accomplished 1st moulting. Mean temperature of this age, 76°.
"	17	52	81	76	S. E.	Clear.
"	18	69	78	76	S. W.	Occasional showers with thunder.
"	19	64	82	71	Variable.	Clear.
"	20	56	80	71	S. W.	Do.
"	21	66	88	83	Do.	Do. Two-crop silk-worms hatched on the 10th, accomplished the 2nd moulting. Mean temperature of this age, 73°.
"	22	72	82	73	N. W.	Clear.
"	23	62	76	71	Calm.	Do.
"	24	62	73	71	Variable.	Cloudy with occasional showers.
"	25	62	75	72	Calm.	Transient clouds.
"	26	62	78	73	Do.	Cloudy.
"	27	66	75	74	S. W.	Cloudy with occasional showers.
"	28	69	82	76	N. W.	Clear. Two-crop silk-worms hatched on the 10th, accomplished the 3rd moulting. Mean temperature of this age, 70°.
"	29	61	82	80	N.	Clear.
"	30	63	85	80	Variable.	Do.
July.	1	63	82	78	S. E.	Ditto. Two-crop silk-worms' eggs of 1838, placed in the ice-house in March, and exposed on 26th June, hatched to day.
"	2	66	78	71	S. W.	Cloudy with copious rains.
"	3	69	86	73	Variable.	Clear in the morning, in the evening cloudy with thunder and lightning.
"	4	65	78	71	N.	Clear. Two-crop worms hatched 10th June, accomplished the 4th moulting, and entered on the 5th age. Mean temperature of this age, 74°.
"	5	61	75	71	N.	Clear.
1839	Days.	Morning.	Noon.	Sunset.	Wind.	Remarks.
July.	6	56	79	69	N.	Clear.
"	7	60	82	78	S. W.	Recently deposited eggs of mammoth yellow silk-worms, hatched this morning.
"	8	62	83	71	Variable.	Clear in the morning, in the evening cloudy with thunder.
"	9	66	87	82	Calm.	Clear.
"	10	68	90	85	Variable.	Clear in the morning, in the evening cloudy with thunder.
"	11	72	90	85	N. E.	Clear.
"	12	62	84	78	N. W.	Do.
"	13	61	85	77	Calm.	Do.
"	14	69	75	73	S. W.	Cloudy with rain.
"	15	66	77	74	Variable.	Dense fog in the morning, rain with thunder in the evening.
"	16	59	78	76	Calm.	Clear.
"	17	62	80	78	N.	Rain in the morning, clear in the evening.
"	18	61	86	78	S. E.	Clear.
"	19	69	88	82	do.	Do.
"	20	75	88	82	S. W.	Cloudy all day, and rain in the evening.
"	21	75	88	81	do.	Clear in the morning, rain, with thunder in the evening.
"	22	74	92	86	do.	Do. do.
"	23	71	87	80	N. E.	Clear.
"	24	70	89	83	Variable.	Clear in the morning; in the evening rain, with thunder.
"	25	74	85	75	do.	Do. do.
"	26	70	84	82	do.	Clear. Two-crop silk-worms hatched on the 1st July, commenced spinning.
"	27	70	84	80	N. E.	Clear.
"	28	70	82	74	Variable.	Cloudy with thunder and occasional showers.
"	29	70	82	75	S. E.	Do. do.
"	30	73	86	80	Calm.	Clear.
"	31	73	91	77	Variable.	Clear in the morning, thunder storm in the evening.
Aug.	1	68	82	77	N. W.	Clear.
"	2	68	74	70	N. E.	Cloudy with copious rain.
"	3	65	75	73	N.	Cloudy.
"	4	66	76	76	S. E.	Transient clouds. Silk-worms of five varieties spinning in handsome style.
"	5	62	84	78	do.	Cloudy. Eggs of two-crop silk, laid 28th July, hatched.
"	6	66	84	78	do.	Cloudy.
"	7	66	84	78	Variable.	Thunder with rain in the evening.
"	8	73	86	78	do.	Clear.
"	9	72	85	78	N.	Do.
"	10	57	82	78	do.	Do.
"	11	66	82	78	S. W.	Do.
"	12	68	82	78	do.	Clear in the morning, thunder storm in the evening.
"	13	66	82	76	N.	Clear.
"	14	62	80	75	do.	Do.
"	15	61	76	72	do.	Transient clouds with thunder.
"	16	62	60	60	N. W.	Rain all day.

1839	Days.	Morning.	Noon.	Sunset.	Wind.	Remarks.
Aug.	17	61	75	72	N. W.	Transient clouds with occasional showers.
"	18	62	75	72	do.	Do. do.
"	19	62	76	74	Variable.	Do. do.
"	20	64	76	72	do.	Do. do.
"	21	64	76	70	do.	Cloudy with thunder and frequent showers.
"	22	66	77	74	do.	Transient clouds with thunder and occasional showers.
"	23	70	77	73	do.	Do. do.
"	24	64	82	80	Calm.	Clear.
"	25	70	86	82	S. W.	Do.
"	26	72	88	82	Variable	Do.
"	27	72	88	80	do.	Clear in the morning, in the evening rain with thunder.
"	28	72	76	70	do.	Clear.
"	29	58	62	61	N. E.	Cloudy.
"	30	58	62	60	do.	Do.
"	31	52	73	70	N. W.	Clear.
Sept.	1	53	73	69	N.	Do.
"	2	56	75	72	Calm.	Do.
"	3	56	73	70	S. E.	Cloudy.
"	4	60	67	62	N. E.	Do.
"	5	64	75	72	S. E.	Do.
"	6	66	78	74	do.	Transient clouds.
"	7	76	88	84	S.	Do.
"	8	78	78	78	do.	Do., with showers.
"	9	78	84	82	do.	Transient clouds.
"	10	72	76	74	N.	Clear.
"	11	60	74	70	do.	Do.
"	12	53	63	64	do.	Transient clouds.
"	13	56	66	64	do.	Clear.
"	14	51	68	64	N. E.	Clear, and white frost in the vallies.
"	15	56	72	70	S.	Clear.
"	16	62	76	72	do.	Do.
"	17	62	76	72	do.	Do.
"	18	72	74	72	Variable.	Transient.
"	19	64	74	70	Calm.	Clear.
"	20	68	78	74	do.	Do.
"	21	68	78	76	do.	Do.
"	22	68	78	76	S. W.	Do.
"	23	68	78	76	do.	Do.
"	24	68	75	72	N.	Do.
"	25	68	78	76	S.	Do.
"	26	64	78	76	N. W.	Do.
"	27	52	76	74	N.	Do.
"	28	54	62	60	do.	Do.
"	29	44	68	66	S.	White frost on the hills and vallies.
"	30	54	70	60	N. W.	Clear.

To the Editor of the Farmers' Register.

Silk-worms of several varieties, some of which are mentioned in the foregoing record, commenced hatching on the 1st of July, and continued hatching in small parcels daily until the 10th. They were very healthy, and reached maturity about the 32nd day; the time which Dandolo assigns as the natural period. The cocoons were firm and neatly formed, but were about 25 per cent. lighter than those produced by the same varieties in June, which were three days later in coming to maturity. The cause of this difference in the weight of cocoons, I do not pretend to know; it was certainly not caused by neglect of the late rearing, for they had the most attention and were fed as well, and cleaned with more regularity. It is evident however, that these facts do not agree

with a theory found in the Chinese treatise, which is becoming quite popular in this country, viz: "that the longer the worms remain in the caterpillar state, the less will be their production of silk." In the treatise alluded to at page 116, we find the following language: "Food must be given to the silk-worms without fail during the day and night. If the repasts are multiplied, it will necessarily result that they will soon arrive at maturity; but if their meals are rare, and not numerous, they will attain their growth slowly. When the silk-worms attain maturity in 25 days, one frame or hurdle will furnish 25 ounces of silk. If in 28 days only 20 ounces can be obtained, and if the time be one month, or forty days, one hurdle will furnish but 10 ounces of silk. Those persons who feed silk-worms ought to endeavor not to sleep. *Laziness has serious inconveniences.*" Now, while I have no apology for negligence, and freely admit that indolent and careless persons are not likely to make as good cocoons as the industrious and careful, I am constrained to say that this theory does not agree with facts as they have been drawn from my experiments. I have conducted twelve rearings of silk-worms in four successive seasons, and of the cocoons of the two-crop worm formed between the 25th and 30th day, from 700 to 800 were required to weigh a pound; and of cocoons formed from the 30th to 35th day, 350 to 400 weigh a pound. The cocoons of other varieties also, were found 50 per cent. lighter than those formed after the 32nd day.

Feeding with wet leaves.—The prevailing opinion for centuries has been, that wet leaves are injurious to silk-worms. The Chinese among various things which silk-worms "do not like," mention *wet leaves*. From recent developments however, it is highly probable, that experience will ere long show conclusively that this opinion, venerable for its antiquity as well as the respectable writers who support it, is a bugbear of the imagination, and deserves to be classed with other *hoary-headed* traditions which have for centuries been propped up by *authority*. Some months ago, experiments tending to show that wet leaves do no harm, had become so numerous in Connecticut, that the editor of the 'Silk Culturist' says "the notion that wet leaves are injurious to the worms, is now generally exploded." Besides these, three quite decisive experiments made in Virginia have been reported,* to which may be added three of my own, one made in 1838, and two in 1839. I cannot discover that feeding with wet leaves does any injury. It is certainly not the cause of the *tripes*, for I have for two seasons found more of that disease among worms fed exclusively on dry leaves. The disease called the *tripes*, is nothing but suffocation caused by a neglect of cleanliness, or a confined atmosphere surcharged with carbonic acid gas. The efficacy of chloride of lime, in preventing this disease, has long been known, and is doubtless owing to its absorption of carbonic acid, by which the atmosphere is kept near its natural state, or in that condition, most suitable for the respiration of animals. In cocooneries, especially when large rearings of silk-worms are made, it is necessary to keep up a very free circulation to prevent the atmosphere becoming surcharged with this deleterious gas.

* By Mr. Archer, Mr. Carter and T. S. Pleasant.

"The respiration of animals is another source of carbonic acid.—On confining an animal in a given portion of atmospheric air, over lime-water, this production of carbonic acid is evinced by a precipitation. The same effect is also produced more remarkably in oxygen gas. The production of carbonic acid by respiration may be proved also by blowing the air from the lungs, with the aid of a quill, through lime-water, which will immediately grow milky. The carbonic acid, thus added to the air, unfits it for supporting life, not merely by diminishing the proportion of oxygen gas, but apparently by exerting a positively noxious effect. Hence a given quantity of air will support an animal much longer when the carbonic acid is removed as fast as it is formed, than when suffered to remain in a state of mixture. It has been found that an atmosphere consisting of oxygen gas and carbonic acid, is fatal to animals, though it should contain a larger proportion of oxygen than the air we commonly breathe." The natural constitution of the then atmosphere, and a climate suited to its nature is the best for the silk-worms, and for all other animals. (See Henry's Elements of Chemistry article "Carbonic Acid," and Farmers' Register, vol. 6, p. 628.)

I will close this communication by commenting on the following, and perhaps some other statements, in Dr. Perrine's letter in the last No. of the Register: "But sir, for the sake of the southern states themselves, I should prefer a much lower valuation of the leaves; and I hope that you yourself will soon demonstrate that you can make \$4 net profit per acre, per annum, by selling on the trees their leaves at 12½ cents per 100 lbs; i. e. \$3,200 pounds of leaves from an acre of the poorest soils." How an acre of land planted with mulberry and enclosed, and cultivated too, can furnish \$4 net profit, or indeed any profit, I am unable to perceive; and all who believe that this estimate comes near the truth, will of course abandon the culture of silk. I venture to assert, that not one person can be found in Virginia, willing to expend \$4 annually on an acre of land, for the prospect of having the same amount returned by a purchase of mulberry leaves. But let us see how this view of the subject looks, when contrasted with Dr. P.'s admission in a former letter, that 200 pounds of leaves are sufficient to produce one pound of reeled silk. The product of 3,200 pounds of leaves, or "one acre of the poorest soil," would be 16 pounds of reeled silk.

16 pounds of raw silk at \$5	\$80 00
Deduct for rearing worms \$16, reeling	
cocoons \$16, and cultivation \$4	36 00

Net product	\$44 00
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We recently sold a small parcel of reeled silk in Philadelphia (the reeling not done in the best style,) at \$5 per pound; and that the charges allowed for "common culture" and other labor are ample, will not be questioned by persons having practical knowledge of the business. The opposers of the culture of silk need take no higher ground than that assumed by Dr. Perrine. Demonstrate that it is true, and this "humbug" will die. I believe it is usual in some parts of Virginia to rent land for one-third part of the gross product, (the tenant performing all the labor,) and if this plan were adopted with a mulberry plantation, the leaves (3,200 pounds) would commonly fur-

nish the landlord 5½ pounds of reeled silk, worth (the expense of reeling being deducted,) \$21 33. At that price, the leaves would not be high, making Dr. P.'s admission, that 200 pounds of leaves make a pound of silk, the basis of one cultivation. The owners of mulberry plantations would of course furnish a building for the accommodation of the worms.

In another part of Dr. Perrine's letter, we have the following language: "But take my estimate of 25 pounds of reeled silk per acre, and then 5,000,000 pounds of reeled silk, will require but 200,000 acres of the poorest soils, (and yet the poorest soils only, produce 16lbs. reeled silk per acre,) of the southern states, or about the half of one per cent. of the superficies of Virginia. How does this agree with the assumption of Judge Comstock, that 85,000,000 of *morus multicaulis*, will not suffice to supply the little state of Connecticut, when tested by the doctrine of G. B. Smith, that for a permanent plantation to make silk, there should be only 2420 trees upon an acre. But as the latter signed the estimate of the convention of 51 pounds of reeled silk per acre, less than 25,000,000 of *morus multicaulis* would suffice to plant 100,000 acres, requisite to produce the 5,000,000 pounds of raw silk."

When 2420 trees are planted to the acre, 100,000 acres would required 242,000,000, or 200,000 acres, 484,000,000; so that Dr. P.'s calculation is wrong in one view to the amount of 217,000,000 and in the other, 459,000,000; and I hold (although not a speculator,) that five times the last named number of trees will be requisite to make the United States a silk growing country, on an extensive scale. There is extensive delusion,* on this subject in the United States, and I regret that one claiming to be a friend to the culture of silk should be using his influence to increase it. Why should we believe that the production of silk in the United States cannot go beyond 5,000,000 pounds annually?

In 1800 the United States exported 16,000,000 pounds of cotton to Great Britain, and to France, 800,000 pounds; in 1833 the export to Great Britain had reached 237,000,000 pounds, and that to France, 1,713,000; besides this, in 1833, the United States exported domestic manufactures of cotton, as follows:

	Valued at.
To the East Indies - - - - -	\$36,000
" China - - - - -	213,000
" Mexico - - - - -	900,000
" the Central Republic, Columbia, Brazil, Buenos Ayres and Chili	1,383,567

\$2,532,567

And yet, as late as 1820 it was asserted confidently by many, that Americans could not compete with foreigners in the manufacture of cotton; that cotton manufactories in the United States might maintain a sickly existence for a few years, but that they would ultimately fail, and involve their projectors in pecuniary ruin. Such will be the progress of the culture and manufacture of silk in the United States. It will meet with opposition and ridicule for several years to come, and when

* Many are making their calculations to feed one or two millions of worms in 1840, who have not trees enough to sustain more than 200,000.

it shall be going on successfully in different sections of the union, we shall still hear the prediction of failure. "You may hold out for a short period, but it will be demonstrated in the end that you cannot compete successfully with other nations," and long after this, when all doubt as to our ability to produce and manufacture silk profitably shall be removed, it will be said, "soon the markets of the world will be overstocked, and the price so low, that the business will be unprofitable."

LAYTON Y. ATKINS.

Stafford county, Va., Nov. 1839.

FOOD FOR HOGS. JERUSALEM ARTICHOKE AND GROUND PEAS.

From the Mississippi Farmer.

In the last Farmer, over the signature of 'An Inquirer,' the attention of the public is directed to some of the articles which may be raised as food for hogs. This is one of the most important items in farming; and I would gladly see the experience of our old planters on the subject, given to the public. To be able to raise our stocks of hogs in good order, without feeding on an article costing so much labor as corn, is certainly a great desideratum—yet one which I am persuaded could be measureably attained, were the proper attention and pains given to the subject. It is merely as *hints*, which I hope may elicit more satisfactory communications, that I propose to give to the readers of the Farmer the remarks which follow.

One of the *cheapest* articles which can be raised as food for hogs, a little experience has proven to me to be the common *ground artichoke*. This sweet and nutritious root is so thrifty in our climate that it may be produced abundantly with no other trouble than that of planting it. Indeed so thrifty and hardy is it known to be, that I have heard several farmers insist that it yielded better without, than with cultivation. It may be propagated either by the seed or the root, though by the root most speedily and safely; on examination of one of the roots, it will be found covered with germs, or 'eyes,' and from each, if planted separately, there will spring a stalk. Hence one of the roots may be cut into a great number of small pieces for planting; and from the rind pared off by the cook when the vegetable is used for the table, (where it is very fine) the plant will spring as well as from the whole root. The manner of producing the artichoke which I would recommend—although a very slovenly one—is, that the farmer would plant with it in the spring the corners of his fences and the waste spots through his fields. By this means, with no further pains whatever, except (of course) to keep his fields closed, there will be produced by the fall, when he opens his farm to his stock, enough of these roots to keep his hogs in food through the winter. Nor would there be a necessity for replanting in the succeeding spring; for though hogs are remarkably fond of the artichoke, and will root to a considerable depth for them, yet they seldom exterminate them from a spot on which they have once taken hold; and the young plants often spring up on the succeeding spring after all their depredations, thicker than ever. The artichoke is so productive that nearly half a bushel of roots may sometimes be gathered from a single stalk.

Another excellent plant for hogs, and one easily cultivated, is the *pindar* or '*gouber pea*.' The yield of this pea is most astonishing, being at the rate of from six to eight hundred bushels to the acre, if properly cultivated. A venerable and experienced planter of Madison county, Maj. Vick, as I have understood, has been for a number of years practising what cannot be an excellent system in the cultivation of this plant. He plants it with his corn, between the hills, and after the same cultivation, leaves it untroubled to turn his hogs upon in the fall. The advantages which I conceive this pea to possess over any others, are these: it is more productive; it does not rot on the ground (as the pea forms itself on a stem which runs under the ground;) and what is of great moment to many of us who have thin lands, the rooting of the hogs for the pea turns under the grass and the vines which make a fine manure; besides which, this rooting is almost as good as the following so much esteemed in the best farming sections of the world, and leaves the ground mellow and loose and in a fine state for the succeeding crop. If Maj. Vick will give to the public through the columns of the Farmer, the results of his experience, I have no doubt the attention of many of our citizens, would be beneficially directed to this plant.

I have also heard the planting of slips of the yam potato in the same manner (with corn) spoken of; and it doubtless would produce many of the same advantages, as it is known that few growths are more manuring, on being turned in, than potato vines.

But from all accounts, I have no doubt by far the most abundant and cheap food we could raise, not only for hogs but for almost every other kind of stock would be the *carrots*. It is said to suit best a light sandy soil, as do nearly all the esculent roots, and would therefore do well in our country. The yield has been known to be upwards of eight hundred bushels to the acre, and two hundred is as low as the most indifferent soil and cultivation are said to produce. In the 15th vol. of 'The Library of Entertaining and Useful Knowledge,' published at Boston, there is a strong recommendation of this vegetable, from which I make the following extract:

"Besides their use as human food, carrots are in some places grown largely for the consumption of stock, especially for horses. It is affirmed that cattle, which have once tasted them, prefer them so much to turnips as with difficulty to be made to return to the latter. The milk of cows fed on carrots never acquires any unpleasant flavor, while at the same time the quantity produced is increased. Calves thrive admirably, and bullocks are speedily fattened on this food. Carrots are equally beneficial as nourishment for sheep, and are devoured with avidity by swine. In the short space of ten days a lean hog was fattened by these roots, having consumed during that period 196 pounds. Its fat proved very fine, white and firm, and did not waste in the dressing. Horses receiving no other sustenance, perform their work as usual without any diminution of their sleekness."

As a demonstration of the vast productiveness and nutritive strength of the carrot, the following from the same article is also added:

"At Parlington in Yorkshire the stock of a farm, consisting of 20 work horses, four bullocks, and six milch cows, were fed, from the end of Septem-

ber to the beginning of May, on the carrots produced from three acres of land. The animals, during the whole of this period, lived on these roots with the addition of only a very small quantity of hay; and thirty hogs were fattened on the refuse left by the cattle."

How immensely are we behind the scientific farmers of the older parts of the world in thrift and economy! and how dearly are we paying for our neglect of these things! Among us if a farmer were asked to support the above stock, if he pursued the usual course, he would put the three acres in corn alone, or with the addition of a few cornfield peas or pumpkins; and with good cropping and his utmost thrift, the produce would scarcely subside the horses alone one-third of the above time.

It will be perceived that all the articles of food for hogs above referred to, are fall and winter fruits. Unless they are gathered and preserved, we will still be without a cheap food during the spring and summer. To supply this gap, I must confess I know of no good substitute to the rye, clover, and grasses of the North; and to them we should turn our attention as speedily as possible. I fear the melons, cymplings, &c. suggested by 'An Inquirer,' could not be produced sufficiently early to take their place to any great advantage. J. J.

ON PREPARING ICE AND FILLING AN ICE-HOUSE, SO AS THE ICE MAY KEEP FOR TWO OR THREE YEARS.

From the Gardeners' Magazine.

Sir.—None of your correspondents having laid before us the proper method of preserving ice, so as to keep in an exposed situation through the hot months of summer, for one, two or more years as may be required, I now venture to do so. Most gardeners who are in the habit of laying up ice annually for summer use, complain of its melting away too rapidly. This, I presume, is owing to the method they practise to preserve it. To remedy this evil, the method which I have practised for a considerable number of years, with the most gratifying success, is as follows:

In the month of December or January, when the water-pools are frozen to a sufficient thickness, say one or two inches, proceed to break the ice in pieces, and draw it off the water with iron hooks, conveying it to the ice-house in carts, as quick as possible. Before throwing it into the house, three or four men should be employed to break it in small pieces, about the size of common road metal. Then carry it into the house, where two men should be again employed in pounding it almost to powder. Lay the bottom and the sides of the house with a layer of wheat straw three or four inches thick. After there are about two feet of ice thus pounded, take ten pounds of salt, and dissolve in ten gallons of boiling water. When the salt is sufficiently dissolved, pour it on the ice through a common garden watering-pot; thus going on regularly every two feet watering, and laying the sides with straw, till the house is filled, finishing with a double quantity of salt water. After it has been in eight days and when it has subsided, fill up closely with small bundles of straw, to exclude all air as far as possible.

An ice-house filled in this manner will be found when opened in summer, to be as firm as a rock, and to require at all times the force of a pick-axe to break it up. It will be found to keep three times longer than the common method of filling ice-houses, and is more suitable for being received from the ice-house for use, as it will keep three times longer when exposed to the air. I was induced to try the above method, on account of our ice-house being placed in a very exposed situation. The sun shines from rising to setting on it, and it was found impossible, before adopting this plan, to keep ice above a year, and now it keeps three years, and the last of it is as good as the first.

SUGAR VERSUS COTTON.

From the Baton Rouge Gazette.

We are aware that it has been a question for some time past with our planters, and one which truly deserves attention, whether the culture of sugar can be carried on in Louisiana with as much profit and success as that of cotton. The opinion has obtained pretty generally throughout the state judging from the remarks of planters and other sources, that the crops of sugar are attended with much less certainty, and the profits fall considerably short of those of cotton; and consequently it is no unusual thing to see a large sugar plantation converted into cotton fields, and valuable sugar houses used for mere storage, or allowed to stand idle.

The effect of cases of this nature is of the most prejudicial kind to the cane-growing interests. Young planters are by this means deterred from entering into this species of business from the fact of seeing others leaving it, without stopping for a moment to reason, or enquire upon the subject. Such we think, ere long will regret the step.

The prospect of the cotton market at present is any thing but favorable, and it is ever, by far, more fluctuating and uncertain than that of sugar; and we should not be surprised if the crops of many plantations this year should sell at a less rate than the actual cost of making them, and especially where these plantations are purchased upon a credit, at ten per cent interest. This sinking condition, then, of the market, should have the effect of encouraging those already engaged in the cultivation of the cane, and lead others to examine into the subject.

We have been at some little pains to obtain information on the comparative profits arising from the cultivation of these two great staples; and the results so far appear to be decidedly in favor of the sugar planter.

An acre of ground which will produce four hundred and fifty pounds clean cotton, will produce twelve or thirteen hundred pounds of sugar, besides the usual portion of syrup and molasses. This we have been informed by planters whose fields lie side by side. And the amount of labor required for the latter is no greater than the former, four and five acres being the average quantity for each hand to tend. What are the conclusions, then, to be drawn from these facts?—They are, that the ratio in pounds between the sugar and cotton, is nearly that of three to one, or that the same land will yield three pounds of sugar to one

of cotton. Valuing the sugar at five cents and the cotton at ten, we have a balance in favor of sugar of one-third, not considering the molasses, which is generally sufficient to defray all the expenses of the cultivation. Such we believe would be nearly the state of the case if facts were obtained and examined.

Another circumstance in regard to this subject, deserves the attention of the planter: that, while the call for home consumption is continually increasing the ability on the part of the foreign planter to afford supplies, will probably continue to diminish. It has been remarked by a writer in the *Boston Courier*, that the sugar business in the British West Indies cannot thrive under the new system of managing. And the rigorous measures about to be enforced against the African slave trade, will probably enhance the price of slaves in the Spanish Islands, and diminish the amount of sugar annually made. The natural increase of slaves in Cuba falls far short of the demand, on account of the excessive hard labor to which they are subjected. The men being worked during eight months in the year, twenty hours out of the twenty four, and consequently are short-lived. Every thing then seem to be in the favor of the sugar planter, and bids him take courage.

The subject, when viewed in the light of political economy, or in that of individual interest, carries with it a strong plea for the attention and study of the planter.

Were a part of the capital and industry at present embarked in the cotton trade transferred to the sugar line, the simple law of supply and demand would be more equal in its influences, in both branches of trade of these great staples.

ARTIFICIAL DIVISIONS OF THE FARM.

From the Farmers' Cabinet.

Fences in rural economy comprehend in general, every sort of enclosure that is employed for shelter—or designed for the protection of the lands thus enclosed, from the intrusion of cattle. They are of different kinds, depending on the various circumstances of soil, situation, the kinds of materials at hand most suitable for the purpose, and the convenience with which they may be obtained. Where a country is entirely in tillage, it is of less importance that farms be divided by artificial barriers; but wherever live stock is kept, this is essential to the proper keeping of the animals, and to the profitable occupation of the grounds; and besides the purpose of retaining and separating animals of different kinds from one another.* Every person about to erect a fence should have special regard to three essential points—durability, economy, and neatness of appearance.

"Poor fences are of incalculable mischief to the farmer." They are frequently the means of disturbing that good neighborhood, which would, in many places, otherwise exist without interruption, if each farmer would attend to having his fences well and substantially made and kept constantly in good order and repair. Unless fences are made sufficiently high and strong, there can be no safety to the crops—the cattle, selecting the

weakest points are apt to break over them, and thereby imbibe vicious habits.

The descriptions of fences and the method of their construction, depend wholly upon the soil, the various kinds of materials at hand or most readily obtained. There are a variety of kinds of fences or enclosures used; the log fence, the post and rail, the worm or zig-zag, and the stone—which, when the materials are on the ground, and the fence is properly built, is by all means the most durable, economical, and secure—the ditch, the paling, and the live hedge. But in whatever manner, and of whatever materials they may be constructed, they should be frequently surveyed with a critical eye, and all defects rectified without the least delay.

The growing and alarming scarcity of timber in the United States, renders the enclosure of farms a very expensive item. It therefore is the interest of the farmer to preserve his fences, now in good condition, as long as possible in that state—and, in the construction of new ones to exercise economy, by having them erected, of whatever materials, in a most substantial and durable manner. The saving of a few dollars in the outlay, is only apparent, not real. We must not be understood as advocating extravagance in this or any other department of rural affairs—but we do maintain that what is worth doing at all, is worth doing well, and that, therefore, in the erection of fences, the best and most durable materials should be selected; and the whole put together in a solid, substantial, and workmanlike manner.

Almost every individual has an idea that he fully understands the process of *making rail-fence*, which is a simple process, and yet, perhaps, not more than one in twenty has any established system or fixed rules, by which their operations are to be controlled in this essential and important department of farm-labor. A writer in the *Genesee Farmer*, says that no sight is to him more pleasing, than a well made rail-fence. His system of construction is briefly as follows:

"To ascertain when a sufficient number of rails have been drawn for a given distance of fence. 1.—If the fence is to be seven rails high, and twelve feet long, place them in piles of ten each, in a continuous line touching each other. 2.—Place, in range, stakes or poles at intervals to designate the line—prepare a pole seven or eight feet long, well sharpened at one end; (the end ought by all means to be pointed with iron.) At about eighteen inches from the pointed end, fasten a rod at right angles with the pole, and extending thence from three feet, two, four, or six inches, according as the fence is exposed to winds. Put down this pole in a range with the poles designating the line, and the end of the rod will show the place for the corner.—Place then, for a foundation, a good sized flat stone, and you are ready to commence operations. 3.—The bottom rail should be straight—place the largest end forward on the stone, and the other end crossing the preceding rail at the end of the rod of the ranging pole, so that the corners on each side be in exact line. 4.—Let the five following rails be placed the smallest end forward, and notched, if necessary to make them lie steadily. 5.—Let the top rail be heavy and well notched, the largest end placed forward, which completes the work, leaving your fence level, and of equal height throughout."

* Low's Elements.

Various substitutes have been proposed for the common post and rail fence, the most prominent of which will be hereafter noticed. Notwithstanding the great scarcity of timber in the Atlantic states, which is a matter of great solicitude, in view of obtaining in future a supply of timber suitable for fencing alone—the system of post and rail fences—with proper management on the part of farmers may be easily and advantageously perpetuated.

James Worth Esq., of Sharon, near Newton, Bucks county, Pennsylvania—a gentleman who has devoted much of his time, talents, and fortune, in promoting the general interests of agriculture—after a minute and careful examination of the claims of all the varieties of fences used and recommended throughout the country, came to the conclusion that the post and rail, and the stone fence, (wherever the materials for its construction abound) was best adapted to the country and the interests of the farmer. Having determined in favor of the post with five rails, for general purposes, he says:—

“I turn my attention to that particular kind, and will proceed to provide for its future supply. Plant an acre of ground with chestnut and locust seeds, five-sixths of it with chestnut for rails, and one-sixth with locust for posts. Four trees will grow on a perch, making six hundred and forty on the acre. I suppose that forty of them will fail, leaving six hundred trees, each of which will produce in thirty years, and every twenty to twenty-five years afterwards, twenty rails or posts, which will yield at each cutting twelve thousand posts and rails, or two thousand pannels. Then say the acre of land is worth eighty dollars, it will reduce the materials to four cents per pannel, which with making and putting up will not exceed twenty-five cents. In point of durability I am persuaded that it will be exceeded by none, except the stone, and it will have an advantage over that by being moveable when necessary.”

Mr. Worth's reasons for preferring the locust post and chestnut rails are thus stated. It occupies less ground than any other—the borders of the fields are easily kept clean—the great durability of the materials—the ease with which they may be obtained by every farmer, as the trees flourish in a tolerably good soil in every part of our country. One acre thus appropriated is sufficient for a farm of five hundred acres—and consequently, a quarter of an acre will be abundant for a farm of one hundred acres. To what better or more profitable purpose can so small a portion of the best land on the farm be appropriated? The only objection is, that there is no immediate availability—that from twenty-five to thirty years must elapse before the trees can be made into rails. This objection is as unsatisfactory as it is unsound. There are thousands who, if they were now to appropriate sufficient ground, according to the size of their farms, and plant it as proposed, may with the blessing of Providence, live to enjoy its advantages for years. What! not plant an orchard, or a grove of locust, or a cluster of maple, because we may not live to enjoy the benefits thereof! Such sentiments should never find an abiding place in the bosom of an American farmer; for every intelligent man knows full well, that every measure of this kind tends not merely to adorn and beautify his plantation, but also greatly to increase its prospective value.

Every farmer should see without delay to having his grounds suitably stocked with trees.

It is estimated that a fence of locust posts and chestnut rails, with very little repair, will last for at least sixty years, so that the necessities of the farm would require only the third cutting of the timber—the two intermediate cuttings, yielding thirty thousand posts and rails are ready for a market, which would be readily found, and which at the low rate of five dollars a hundred, would give the owner of the farm an average gain of twenty dollars, for each and every year the acre of land was thus appropriated—in addition to furnishing all necessary fencing for the farm. This, dating from the commencement, is a handsome profit.

Cedar post and rail fence.—James Garnett, esq., a name familiar to the reading farmer, says: “I can affirm, from my own experience, that a cedar post and rail fence, without any ditch, the materials for which grow spontaneously over a large portion of Virginia, and will grow by planting almost any where in the United States, will last, without the slightest repair, from thirteen to fourteen years; and may be made to last six or eight years longer, by a few occasional supplies of rails and posts. I also know from my own experience, that either cedar, chestnut, or locust, the last of which is more durable than either, will in fourteen years grow sufficiently large to make the fence anew, if planted by the side of it one or two to each pannel.”—*Mr. Garnett's Address before the Fredericksburg, Va., Agricultural Society.*

A great diversity of opinion has prevailed among many persons, as to the best time for cutting timber, so as to insure its greatest durability. Some recommend the summer season, some the fall, others the winter when the sap, has generally descended; while others again who have entered into a careful investigation of the subject, have come to the conclusion that the most suitable period for felling timber, is in the spring while the sap flows freely. This will no doubt be considered as rank heresy by many of those who cannot regard with complacency, what they deem innovations on the old and favorite systems. But this opinion is gaining ground; from the simple circumstance that it is well sustained by incontrovertible facts.

An old and observing friend, Capt. Cooper of the Navy, furnished for publication some time since in an agricultural work, a variety of facts, touching this important matter; from which it clearly appears, that spring, that is, while the sap is flowing freely, is the best time for cutting timber.* The late Joseph Cooper, Esq. warmly advocated this system. In the same paper, page

* Farmers' Cabinet, vol. iii. p. 29.—one fact we give.

“J. C. (Joseph Cooper, Esq.) informed me that a detachment of British troops crossed from Philadelphia on the 1st day of May, in 1777, and on the 2d commenced cutting down his woods for the supply of the army, and at the same time to burn up his fencing, which they completely accomplished. “But,” said he, “they taught me the proper time to cut timber to make it last. After they marched off, I found many trees that were not cut into cord wood: those I split into rails, believing at the same time they would soon decay, from their being cut in the spring—but I have been agreeably disappointed—most of them are as sound now as when made into fence.” This he related five-and-twenty or thirty years after the peace of '83.

4, is a communication recommending the month of August, within one day of the time when the moon is full, as the best period for cutting all kinds of oak. But it is urged, in order to guard it from decay, to immerse the wood, immediately after it is cut and split to the dimensions required, in lime and water, in which it is to remain a year, affording time for the particles of lime to penetrate the pores of the wood. This lime water is to be frequently agitated. This process requires a vat, which may be sunk in the ground at a little expense. The water and lime should be of the consistence of white-wash. If the durability of the timber is promoted by this process, it is evidently owing to the antiseptic quality of the lime-water, with which it is saturated, and not to the mere circumstance of cutting the timber in the month of August.

The editor of the Genesee Farmer, and a host of his correspondents, recommend cutting timber in the winter, as its durability depends upon its being cut when free from sap. Joshua Howard says, that from twenty years experience in the preservation of timber, the best time to cut it to insure durability, is when the tree is in its greatest vigor—which, in the latitude of his residence, Dearbornsville, N. Y., is about the middle of June. He cites a case in which a man was convinced against his will. A farmer in North Carolina wishing to fence a certain lot, went to work according to the old theory, and cut his rail timber during the full of the moon in February. When he came in May to put up his fence he was deficient about forty pannels—he went into the woods, cut the requisite quantity, and put it up as the only alternative. Ten or twelve years afterward on examining his fence, he was exceedingly surprised to find that the rails cut and split in May were infinitely more sound than those cut and prepared in February. There are thousands of similar cases.

A great variety of plans have been proposed for the preservation of timber. The late Samuel Preston, of Stockport, Pa., was satisfied from experience, that posts set with the top part in the ground will last from three to four times as long as when they are set with the butt-end down. Daniel Longstreth says, that penstocks and other timbers exposed to wet or dampness near the water wheel, are placed by many mill-wrights with the top end downwards, as they are found to be more durable than when placed in a different position. Charring posts has been strongly recommended and extensively practised, without, however, answering fully the expectation of its advocates. Wood tar has been recommended as a preservative of timber. A correspondent of the Farmers' (Va.) Register, cites several very interesting cases which go to prove that posts cut, and put in the ground green, will remain perfectly sound many years after well seasoned posts, in the same line of fence, in the same soil, and put in at the same time, have entirely decayed. We need, however further experiments on all these points.

SOAP MAKING.

From the Genesee Farmer.

Much difficulty is often experienced by those who manufacture their own soap; frequently indeed the operation succeeds well, but sometimes

it totally fails from unknown causes. Often when every precaution has been apparently taken, complete failure has been the consequence; and the time is not long past, when some have even declared that they believed their soap was bewitched. But if the rationale on which the process is founded, is but understood, the whole becomes simple and easy, and may be performed with an absolute certainty of success.

Common soft soap is composed of oil (or fat,) and potash. The potash is obtained from common wood ashes, by causing water to run through it, which dissolves the potash contained in the ashes, and leaves the residue behind. The manner by which the oil or grease is obtained is well known. These are made to unite and form soap by being boiled and well stirred together.

One of the first requisites in soap making is that there should be a sufficient quantity of potash dissolved in the water, or in other words, that the ley should be strong: this is readily ascertained by an egg; if the egg floats the ley is sufficiently strong; if it sinks, it is too weak, and must be increased in strength by evaporating a part of the water by boiling, or by passing it again through ashes.

But it not unfrequently happens that the ley is found by trial to be too strong, and yet good soap cannot be produced. This is almost always owing to the potash of the ley not being caustic, or capable of corroding the skin, which state is absolutely requisite to success. Potash in its pure state is highly caustic; but when ashes have been for some time exposed to the air, they gradually absorb from it a portion of the peculiar kind of air, existing in small proportion in it, known by the name of carbonic acid, which destroys the caustic properties of the potash, and renders it unfit for the manufacture of soap. Now, as quick lime has a stronger attraction for carbonic acid than potash has, it is only necessary to place a quantity of lime, in the proportion of half a bushel of lime for a hogshead of good ashes, in the bottom of the leech before filling it, and it will abstract the carbonic acid from the potash of the ley, as it passes downward, leaving it in a comparatively pure and caustic state. In order to prevent failure, therefore this should always be done. In order to ascertain if ley contains carbonic acid, pour a few drops of sulphuric or nitric acid into a wine glass of the ley, when, if it contains much, a violent effervescence (or boiling up of bubbles) will instantly take place, owing to the escape of the carbonic acid. The carbonic acid may be removed from the ley and render it fit for soap making, by boiling the ley with quick lime.

If the ley be strong, if it be rendered caustic, and if there be a sufficient quantity of tolerably clean fat, there can be little danger of success. The proportions should be about thirty pounds of fat to eight or ten gallons of ley.

Hard soap consist of soda instead of potash, united with fat; and is commonly made by adding common salt (which consists of muriatic acid and soda,) to well made soft soap while it is yet boiling. The soda of the salt unites with the fat, and forms hard soap, while the potash unites with the muriatic acid of the salt and separates by falling to the bottom of the vessel. Different degrees of hardness in soap are obtained by using potash and soda, at the same time, in different proportions. Hence grease from salt meat has a tendency to in-

crease the hardness of soap unless the salt be previously removed by boiling in water.

Soap of tallow is made in England, and largely in the United States, and is the best in common use; when scented with oil of caraway seeds and cast into a mould, it is used for the toilette, and is called Windsor soap. Other toilette soaps are made with butter, hog's lard, or with almond, nut or palm oil. Sometimes fish oil is used for coarse soaps, as well as linseed oil; and rosin is often added to give a yellow color and odor. The following proportions (by weight) have been given for a good yellow soap; tallow twenty-five, oil four and a half, rosin seven, barrilla, (soda) eighteen, settlings of waste ley, evaporated and calcined, ten, and palm oil one-half part.

Soaps are colored blue by indigo, yellow by turmeric, &c.; and marble or veined soaps are made thus:—to the soap just separated from the spent ley, new ley is added, and then copperas dissolved in water; red oxide of iron (or colcother,) mixed with water is stirred in it by manual dexterity, and is so mixed as to produce the peculiar appearance.

MR. G. G. GLEASON'S EXPERIMENT OF SILK CULTURE.

From the Journal of the American Silk Society.

To the Executive Committee of the American Silk Society.

Gentlemen—Feeling a deep interest for the welfare of my fellowcitizens, and believing it the duty of every individual to contribute his mite, however small, for ameliorating the condition of the human race, and thus rendering them more comfortable and happy, whenever an opportunity presents itself; and further, wishing to aid in settling the dispute, which is now extant throughout the country, whether the growth of silk in the United States will be beneficial to our country, as well as profitable to the grower.

Believing that through the medium of the growth of silk, a new epoch in the prosperity of our country has dawned upon us, by giving to us a new staple, which will supersede the immense importation of a fabric, of foreign growth and manufacture; thus saving twenty millions of specie annually in the country, for the use and benefit of its inhabitants, giving labor to a great number of indigent and destitute females, to the decrepit and young of the opposite sex; and having tested by my experiment the past season, the lucrative reward which every silk grower may expect, in exchange for his investment and labor, I transmit to you the following facts, relating to silk growing as ascertained by me, as an encouragement to those who have already, and to those who shall, espouse this worthy cause.

On the 25th of April last, I planted one-fourth of an acre of ground with *morus multicaulis* cuttings, from layers of the previous season's growth, in rows, the rows being nearly three feet apart and the cuttings one foot in the row, it requiring thirty-six hundred cuttings, which I designed to appropriate to an experiment, to test the profits which a silk grower might expect to realize from an acre, planted with *morus multicaulis*.

The ground was laid off in a parallelogram form thirty-five by three hundred and eleven feet. The soil being of a sandy loam, of no more than ordina-

ry quality; the trees, on the eighteenth of June, had not attained more than the average height of twenty inches, but at digging time the average of four feet, being thirty-seven hundred in number.

I then exposed about forty thousand eggs, which I had purchased in Hartford, to hatch; but the eggs proving bad, there were but very few of them hatched, and they died immediately.

On the 29th of June I again exposed about ten thousand eggs, which I had purchased of Mr. McLean, of which about eight thousand hatched, of which four thousand were mammoth white, two thousand sulphur, and two thousand two-crop; they were perfectly healthy, the white having completed their labours in twenty-six days, the sulphur and two-crop, in twenty-nine days, produced twenty-eight pounds of cocoons, or if flossed two and one-half bushels; it requiring eleven pounds, or twenty-eight hundred of the white and sulphur, and forty-four hundred of the two-crop, to the bushel.

I selected twenty-five pounds of the best cocoons for eggs, which produced twenty ounces of pure eggs; by counting I found that one ounce contained thirty six-thousand eggs.

The remaining three pounds of cocoons I reeled, they being of an inferior quality produced but four ounces of silk, it requiring at that rate, twelve pounds of cocoons for one pound of silk.

The worms having required five hundred and seventy-one pounds of leaves, the waste and dry leaves being included, according to my best knowledge, it requiring at the rate, twenty and one-half pounds of leaves, to produce one pound of cocoons, or two hundred and eighteen pounds of leaves to produce one pound of reeled silk; it requiring ten pounds ten ounces of cocoons to make one pound of silk, as I ascertained by reeling my next crop of cocoons.

I exposed on the 5th of August eighty-five thousand eggs, of which, about seventy-five thousand hatched; they were likewise perfectly healthy, and on the fifth of September a few thousand commenced winding; on the sixth several thousand having wound. The remainder were unfortunately destroyed, in the following manner: my leaves were kept in a cellar which was also used for other purposes, a quantity of salt fish were taken from a barrel and hung to the beam, which dripped on the leaves, and when the worms were fed for the last time in the evening, it being dark, nothing was detected, when next morning almost the whole crop was dead, the fish brine having evidently destroyed them, thus deranging in part my experiment.

Being before sceptical as it regarded the profits to be realized by growing silk, I found to my great astonishment, that the trees from which I had picked and weighed the leaves had produced near three-fourths of a pound of leaves per tree; believing that if I had picked all the leaves from those trees, the aggregate would have been seven-eighths of a pound per tree.

I reeled and manufactured the cocoons produced by my last crop of worms, into sewing silk. It having been examined by competent judges in the city of New York, is pronounced equal in lustre, and surpassing in strength, the very best of Italian; a part of which I present for premium in reference to best sewing silk.

If the products of one-fourth of an acre, are two

thousand seven hundred and seventy-five pounds—it being three-fourths of a pound of leaves per tree—then the product of the acre would be eleven thousand and one hundred pounds of leaves. It requiring twenty and one-half pounds of leaves to produce one pound of cocoons, or two hundred and eighteen pounds of leaves for one pound of silk, the products of the acre then would be five hundred and forty-two pounds of cocoons, or fifty-one pounds of reeled silk.

Now the product of an acre, is fifty-one pounds of silk; it requiring ten pounds ten ounces of cocoons for one pound of silk, equal to forty-nine bushels; eleven pounds of cocoons making one bushel, a product, which I believe every silk grower may expect the first season, if the trees are planted in a soil congenial to their growth, and the worms managed with economy.

If the cocoons are sold at five dollars per bushel—which I believe is the present price of good cocoons—the product of the acre would be two hundred and forty-five dollars; or if the cocoons are sold at four dollars and fifty cents per bushel—which is as low as I believe they will be for years to come—the product of an acre would amount to two hundred and twenty dollars and fifty cents.

If the cocoons should be reeled, the product would be much greater.

As it regards the expense of feeding, &c. I found that an inexperienced person would pick twelve pounds of leaves per hour, or one hundred and twenty pounds per day; and that one person would feed two hundred and fifty pounds per day—then it would require ninety-three days labor to pick the leaves produced from one acre, and forty-five days labor to feed the same. The whole expense of labor of picking and feeding the leaves would amount to one hundred and thirty-eight days labor—equal to twenty-three weeks—which would amount to sixty-nine dollars, allowing the girls employed, three dollars per week.

A one-story building fifteen by twenty-five feet which would cost, at most, one hundred and fifty dollars, would be sufficiently large to feed the products of one acre, by feeding successive crops—then the rent of cocoonery would be nine dollars, allowing six per cent. interest.

Allowing cocoons to be worth forty cents per pound, fifteen pounds being sufficient to produce eggs enough to feed the products of an acre, if but one-half of them should hatch and mature—thus making the cost of eggs to be six dollars. To which add ten dollars for rent of land, and ten dollars for cultivation of trees.

The whole expense of picking and feeding, the leaves, rent of cocoonery, rent of land, cultivation of trees, and eggs, would amount to one hundred and four dollars; which, if subtracted from two hundred and forty-five dollars, would leave a net profit of one hundred and forty-one dollars—or, if even subtracted from two hundred and twenty dollars and fifty cents, would leave a net profit of one hundred and sixteen dollars and fifty cents per acre.

After taking into consideration the great improvements which will be made in this, as in all former enterprises, both as it regards feeding the worms and manufacturing the fabric; and, viewing a country groaning under continual convulsions and panic in its financial affairs, occasioned by an excessive importation of a foreign fabric, and manufactures to the amount of forty millions annually

beyond our exports, and our American silk being sought after with such eagerness by foreign manufacturers, it commanding the highest prices, with a country possessing a soil and climate better adapted to the growth of silk, than almost any other country on the globe; it producing more silk from a pound of cocoons, than even France or Italy, of a stronger fibre and a more transcendent lustre together with the enterprise of its inhabitants, and the immensity of its uncultivated lands; and the growth of silk promising to remedy, in a great measure, the cause which threatens our citizens with ruin; and as long as the grower can realize at least one hundred and sixteen dollars, net profit, per acre, with the prospect of increasing his net profit per acre, at least one-fourth each succeeding year for years to come. Fellow-citizens fear not to give it a hearty support, it is a good cause.

Not until man is endowed with the power to command the waters of the mighty deep to stand fast, and become as a wall, that ships cannot plough her frightful main, thus saving our country from being deluged by foreign importations, till then, and not till then, may we say farewell to the growth of silk.

After contemplating the weighty responsibility which would rest upon me, provided the growth of silk should prove a failure, by recommending it to the attention of the public, and the anathemas which would be hurled against me, being denounced as a person engaged in a maniac speculation—a mere delusion—designed to humbug the unthinking citizen by wrenching from him his hard earned treasure; in view of these facts I solemnly declare, that the motives which now influence me to press this subject so ardently to the consideration of my fellow-citizens, are a love of country and a wish to promote the personal interest of every individual living under its banner, together with my own.

Did I not believe in the entire success of the growth of silk in these United States, I would rather consign my trees to the flames than to beguile my fellow-citizens by recommending to them an enterprise which I believe would prove derogatory to their pecuniary interest.

The validity of the growth of silk might be tested to the conviction of every individual, either to its entire success or its total failure, let every individual conveniently situated, prove by his experiment the next season, the profit to be derived from growing silk, and when that experiment is made, let him publish the same to an anxious public, and then if it should be found that the growth of silk should not prove profitable to the grower, and detrimental to the best interests of the country, then let those who are now averse to the growth of silk, hurl their denunciations against those who are engaged now in advocating its merits.

Yours, very respectfully,

G. C. GLEASON.

Morrisville, Middletown township, }
Monmouth Co. N. J. Nov. 18, 1839. }

ROOT CULTURE.

From the Lexington Gazette.

Mr. Baldwin:—In answer to your question on the subject of cultivating the mangel wurtzel beets, I would say, in the first place, that I plough my land as early in the spring as it can be done, say from the first to the tenth of March; it remains in this situation until the middle of April, or if the season is backward, until the twenty-fifth. I then manure the land, putting on from fifteen to twenty-five wagon loads of manure to the acre. After spreading the manure carefully over the land, I again plough it very deep, say ten or eleven inches; the land is then well harrowed and rolled, with a heavy roller, so that the soil may be entirely pulverized. After this is done, I lay it off in rows, with a very small mattock plough, twenty eight or thirty inches wide. The seed is then dropped in the drill about five inches apart, on the supposition that only one half of the seed will vegetate. After they come up and are grown large enough to be transplanted, they are then thinned, so as to leave one every ten inches; and with the surplus plants I supply any that are missing. When small, it is necessary that they should be kept very clean. The beet is very easily destroyed when small by weeds or grass of any kind. While small, they are cultivated with a hoe; after they have grown larger, so that they can bear some mould, they are worked like corn with a shovel plough. I usually raise them about the tenth of November. A good hand can pull up twenty tons in a day, and two hands can gather and bury them, as we do Irish potatoes. Having given you all the information I can do on the subject of raising the beet, I will now answer your question as to its product, and also its value as winter food for stock. I do honestly believe that twenty five tons may be raised on one acre, with a first-rate soil and a favorable season. Last summer, I planted two small lots, say one fourth of an acre in each lot. From one of the lots, I had nine thousand seven hundred and twenty pounds; many of the beets weighing fourteen pounds, and some more. The latter part of the season was very dry, and cut my crop short at least one third. I believe, that if the season had been good, the quarter of an acre would have produced six tons. As far as my experience goes in feeding the beet to stock, I consider one ton of the beet worth ten or twenty bushels of the corn, so that the product of one acre of good soil, in a favorable season, is worth two hundred and fifty bushels of corn. I have generally fed the beet to my milch cows, and I have as much milk in December as in June, and of the finest quality, very rich and of a pleasant flavor. I believe one acre of beets will feed ten heeves from the first of November to the first of March, and by adding a small quantity of corn meal, the beet will make as fine beef as any thing they can be fed with; one quart of meal per day mixed with the beets would probably be enough. I found a few sugar beet among the mangel wurtzel. I am inclined to believe that equally as many sugar beets can be raised to the acre, and they contain more nourishment. I also planted some of the ruta бага turnip. The season was so very dry, that they did very little good, but I am inclined to believe that if the season suits them, they are as productive as the beet. They are, however, in

this climate, much more uncertain. If every farmer would plant five acres of beets, he could winter a common stock of sheep, say one hundred head, a large stock of hogs, some ten or twenty milch cows, and fatten twenty beeves. All kinds of stock are very fond of them. From my little experience, I am convinced that one hand can raise more food for stock in the shape of beets, than four hands can raise in the usual way of farming, say by producing corn, rye, wheat, &c.

I am yours respectfully,

B. WELCH.

P. S. The beets are fed to stock simply by chopping them up. To add corn bran or some meal, helps very much.

B. W.

GOVERNMENTAL OBSTACLES TO THE PROPAGATION OF TROPICAL PLANTS IN SOUTH FLORIDA.

[In the following communication we again present to the notice of the public a subject of grievance, the existence of which is as strange as it is impolitic, and injurious to national and especially to southern agricultural interests. We earnestly wish that, in so doing, we could command for it the consideration of the Secretaries of the Treasury, Navy, and War Departments, and of the representatives in Congress of the southern states. Putting aside the high importance to southern agriculture of the object which Dr. Perrine has devoted his life and all his energies to promote, we confess we should feel a deep interest in his success, even if having regard solely to himself. We have no acquaintance with Dr. Perrine, except so far as learned from his persevering labors for this, the great object of his life, and from subsequent correspondence in writing. But of this, we feel perfectly assured—that no man can be less actuated by selfish motives than he has been in this matter, or more by a pure love of his country and of mankind. This belief alone would induce our best wishes for the removal of all obstructions to his success, even if the object itself were not, as we fully believe it to be, of great importance. The ultimate effects, if permitted to be produced, will not be merely the introducing into Tropical Florida some valuable exotics from other tropical regions; but the still greater benefit of gradually naturalizing such plants to colder than their native localities, and thus, in time, introducing them far into the temperate zone. And when it is considered that the most important of our crops have been thus drawn from their former sole position in the torrid zone, and that there are still numerous plants, of great value, the growth of which has not been thus moved, there is every reason to believe that there remains an abundant harvest yet to be reaped. It would be a very important national object, if some of the valuable plants of the tro-

pica could be introduced and established in the southern extremity of Florida, if to extend no farther northward. But it is not difficult to believe that many such may be gradually acclimated so as to be produced successfully through all the cotton country, and thus offer many subjects of cultivation for profit to that great region which now has but one. All that is now asked of the government, is, that its action, or its neglect of the claims of policy and justice to other interests, shall not obstruct, as now, the attainment of Dr. Perrine's great object, and render perfectly nugatory all that has been heretofore done with the view of aiding him in that respect.—ED. FAR. REG.]

To the Editor of the Farmers Register.

I respectfully transmit for your serious consideration, a brief compend of some important facts, which should excite the remedial influence of the enlightened agriculturists of the southern states.

While American Consul at Campeachy, the government of the United States, by its treasury and navy circular of the 6th September, 1827, officially invoked my individual aid to introduce tropical plants into the United States; yet when collected by me, the same government, not only neglected to transport them in the proffered vessels of the navy—but also interposed insuperable obstacles to my direct introduction of them into the only suitable section of the union. After four years of fruitless exertions, I therefore returned to the United States for the special object of overcoming these governmental obstacles to individual industry, by enlisting a combination of agricultural influence, in the form of a chartered company; and at New York, on the 8th November, 1831, these circumstances were communicated in a letter to the Hon. Secretary of the Treasury. The unexpected publication by the department of said letter, incidentally communicated my views to the governor of Florida, who on the 2nd January 1832, transmitted to the legislative council of the territory a warm recommendation to grant a charter, "although Mr. Perrine has made no direct application," and to bestow upon the company many privileges; and hence resulted the unanimous passage of the first act to incorporate the Tropical Plant Company of Florida. The governmental obstacles to the bare acquisition of the soil of South Florida, next induced me, on the 6th February, 1832, to address a memorial to the congress of the United States for a conditional grant of a tract of land in that unsurveyed district, which resulted, on the 26th of April, in the report of a "bill to encourage the introduction and promote the cultivation of tropical plants in the United States." As however, that bill was never even called up for discussion during that very long session of congress, the organization of the company could not be accomplished; and I was hence compelled, in November 1832, to return to Campeachy to wait in painful patience for the congressional removal of the primary obstacle of governmental impediment to individual acquisition of the sterile soil.

In the spring of 1833, I had the first and only gratification to know that several valuable plants of Yucatan sent via the foreign port of Havana

had finally entered the remote port of Key West, and had ultimately lived through their interrupted and protracted route from that village to Cape Florida. There they were entrusted to the care of John Dubose, the then keeper of the light house on Key Biscaino; but as, in December 1835, the population in that vicinity were murdered and expelled by the savage Seminoles, the progeny of said tropical plants were necessarily left to propagate themselves.

In 1837, the probable prospect of a speedy termination of the Seminole War induced me to leave Mexico, and proceed through New Orleans, Havana, and Key West, to this miniature islet of Indian Key; and as this island contained the only resident population nearest to the main land, and the only suitable person to propagate my many tropical seeds, I left them in the care of Charles Howe esq. on the 5th August 1837. I then proceeded to Charleston, S. C., where the Agricultural Society of South Carolina manifested the same enlightened interest in behalf of my enterprise which had previously been exhibited by the Agricultural Society of Louisiana. Fortified by the co-operation of the two principal states of the south and south-west, I proceeded thence to Washington, D. C., to call up in congress, the bill reported the 26th April 1832; but the special session was exclusively devoted to the sub-treasury question, and hence I was obliged to wait for its consideration by congress during the ensuing long session. The final result of my persevering labors, with the accumulated influence of public opinion, was manifested by the congressional law approved the 7th January 1838, entitled "an act to encourage the introduction and promote the cultivation of tropical plants in the United States." To the congressional documents which accompanied the reports of the committees on agriculture, I refer for many important details; and I especially invite the most serious attention of all enlightened agriculturists of the southern states, to the first twenty pages of the senate report.

By the conditional provisions of said congressional law, it will be perceived that it might be more appropriately entitled "an act to allow private individuals to make a national experiment at their own expense," because, by the terms of the law, if the propagation of tropical plants in South Florida shall be a successful enterprise, the government will be benefited a thousand-fold, and the nation will be benefited a million-fold; but if the domestication of tropical plants should be an unsuccessful enterprise, myself and my associates will be the only sufferers.

In other words, after nearly eleven years of governmental obstructions to the execution of the governmental instructions in its own circular of the 6th September 1827, on the 7th July 1838 the congress of the United States barely rendered one governmental obstacle to individual industry by a formal permission for the conditional acquisition of six miles square of land, in a desert district, which government itself has always declared too sickly and too sterile to warrant the trouble or expense of survey or sale. A desert district which is governmentally shown to be unconquerable, unoccupable, and even unaccessible, by a white army, and which is moreover governmentally denounced to be unimprovable, uncultivable, and even uninhabitable, by the white man.

But, sir, you know that all my hopes of happiness for time and eternity are staked on the sincerity of my convictions that South Florida enjoys the most healthy climate and soil in the United States; and that all useful plants of the tropics may be profitably domesticated in Tropical Florida.

It should however, be very evident to the whole people of the United States, that neither isolated individuals nor distant companies, can ever use any effective means to introduce and to propagate valuable plants in Tropical Florida so long as governmental obstacles to individual industry in this desert district are not governmentally removed; I therefore anticipated the indispensable necessity of endeavoring to enlist the agricultural influence of the southern states, by obtaining the new act of incorporation for the Tropical Plant Company of Florida, approved February 8th, 1838. I had however, strong reasons to expect the indirect removal of one governmental obstacle to individual introduction of tropical plants, by the probable establishment of one port of entry near the natural central rendezvous of the wrecking vessels on this reef; where a port of entry should have been long since established for the benefit of shipwrecked persons and property alone, which have hitherto been governmentally debarred from the free exercise of their natural and moral rights to seek the nearest and most convenient spot for safety. This reasonable expectation, of course, constituted an additional motive for the nearly central location of the preparatory nursery for tropical plants on Lower Matacumba the 8th January 1839; but the long repeated claims of justice and humanity were again defeated the last session of congress through the unjust and cruel powers of the single monopolizing port of entry for all South Florida; first established and pertinaciously retained by experienced speculators at the remote and inconvenient island of Key West. This great governmental obstacle to the individual introduction of tropical plants is greatly augmented by the great local obstacles, resulting from the deplorable fact that the only and the whole population successfully created by that governmental monopoly, became necessarily a strongly anti-agricultural population, both from their only occupation and their only location. According to Bowditch, Key West is $24^{\circ} 29'$ north latitude, and $81^{\circ} 55'$ west longitude, and Cape Sable is $25^{\circ} 1'$ north latitude and $81^{\circ} 9'$ west longitude; that is, this only port of entry is to the leeward 32 miles south and 46 miles west of the most south-western extremity of the peninsula. With this exclusively wrecking population at that remote speculating location, it is very evident that the resident governmental officers must necessarily have strong interests and great powers to perpetuate the governmental monopoly of the whole business of the whole reef; that transient governmental officers of the navy and revenue service are most likely to be most influenced by the words and feelings of the resident governmental officers; and that the consequent abuses of the powers of either class cannot be prevented by the fear of public opinion, and cannot be punished by the force of civil law. It is hence very natural that the public officers, private proprietors, and all the dependent population of Key West, should constitute a formidable host of organized enemies to every mercantile im-

provement of every other island nearer to the natural centre of the only business of the reef, to every agricultural industry in every portion of South Florida approximating to the same centre; in short, to every person, place and enterprise which has any tendency to diminish their hitherto absolutely despotical monopoly of the whole business of all South Florida, by indicating the indispensable necessity of an additional port of entry. But the easternmost population at Indian Key is in $24^{\circ} 49'$ north latitude and $80^{\circ} 55'$ west longitude, or 19 miles north, and 60 miles east of Key West; while it is but 13 miles south and 14 miles east of Cape Sable, and the preparatory nursery for tropical plants is on Lower Matacumba, only one mile west of Indian Key.

The most experienced men of the world will hence be least surprised at the natural effect, that since the 8th of January last, I have not been able to obtain for the preparatory nursery a single plant, from even Cuba, through the only port of Key West. The most intelligent agriculturists can best calculate the vast damages of a single year's delay in the geometrical multiplication of the first desirable plants in even the wintry zone, and can hence best imagine the incalculable damages of the same delay in the progress of a preparatory nursery of valuable plants in Tropical Florida.

But on the 8th January 1840, one year of fruitless exertions will have elapsed; and it is very evident that the preparatory nursery for tropical plants cannot ever be filled with the useful plants of even the Bahama Islands, until an additional port of entry shall admit the direct importation of living plants at the only proper season of the summer rains.

But it is notorious that in the congress of the United States there exists a powerful anti-southern influence against every measure adapted to promote the settlement and cultivation of the territory of Florida, and consequently against every means of removing any governmental obstacle to the introduction and propagation of tropical plants in Tropical Florida.

As then, the only population in all South Florida is an exclusively anti-agricultural population; and as there does exist in congress a strong anti-southern influence against all agricultural improvement of South Florida, it is evident that next session no measure will be adopted to remove any obstacle to agricultural industry in South Florida unless effected by the powerful counter influence of the enlightened agriculturists of all the southern and south-western states. The first essential measure then, is the effective excitation of congress to withdraw great governmental wrongs, by the immediate opening of ports of entry in South Florida, at the most suitable sites to diminish most the governmental obstacles hitherto grievously interposed to the natural salvage of wrecked persons and properties along the reef, and simultaneously to the natural settlement and cultivation of the main land of Tropical Florida.

Very respectfully,

Your obedient servant,
HENRY PERRINE.

P. S.—Is it not deplorably true, that all my labors for Tropical Florida have merely been the isolated efforts of a single agriculturist in a desert

district, feebly struggling against the ruinous obstacles to individual industry powerfully interposed by the national government of the United States, by all the red men on the savage main land, and by the only white men on this wrecking reef? Is not hence this great enterprise essentially dependent on the mighty influence of the united efforts, the associated exertions of all southern agriculturists? And is it not physically impossible for an isolated individual to overcome the combined obstacles powerfully interposed by the inimical government of the United States at Washington, by the murderous red men on the desert main land, and by the hostile white men on the wrecking reef of Tropical Florida; all pertinaciously sustained by the ruinous policy of the same inimical government? H. P.

IMPORTING WORK HORSES FROM FRANCE.

From the Franklin Farmer.

Mr. Editor:—We have been too much in the habit of going to England for all our notions, and we have consequently in some instances adopted her prejudices at the expense of our interests. Liberalism requires of us to do them justice; but expanded views demand that we adopt the improvements of other nations, when reason and propriety sustain us in giving them a preference. I have been led to this introduction by reading the communication under the signature of Sam^l. D. Martin in a late number of your paper, as to the white color of the improved Short Horns. An Englishman will derive it from a native wild breed. The evidence adduced by Mr. M. is not indeed copious, but it is very persuasive to my mind that the white color was imported by Sir Wm. St. Quintin from Holland. Cattle were imported, and of that color, to improve the Teeswaters. The dray horse of England we have, was imported from that country; and the English race horse is also known to be descended from stock imported from Asia and Africa. We all believe, who have paid any attention to the subject, that the English domestic horse may be improved by selections and raising for thousands of years, and one four mile racer could never be brought to the post, with any prospect of success. From the superior sizes and strength, and stride of the modern race horse, it is conceded, they can go over the course sooner than the original Arabian, Barb or Turk; but they have evidently lost something of the temper, metal, symmetry, polish and attitudes of the original; and notwithstanding their continual boast of their "high bred cattle" the English are still occasionally infusing portions of the oriental blood into their stock. And, who among them doubts, that such a horse as the Darley Arabian, the Godolphin Arabian, the Byerley or Hemsley Turk, or the Curwin Bay Barb, would be now a desirable cross. And whatever they may think or do, should not we who have set up for ourselves in government, politics and thinking, resort to crosses to give beauty, docility, activity, soundness and lastingness to our thorough-breeds? Lindsay's Arabian, or his equal would be a decided improvement upon our leggy and overgrown and coarse full-breeds.

Napoleon declared that their Limousin and Na-

varrese horses were better for war than the English thorough-bred. It is not extreme speed merely, according to him, which makes a good war horse it is sprightliness, activity, quickness of perfection and docility and I add *lastingness*, and all these qualities are prominent in the Arabian. In his opinion a good Arabian stallion is the best horse in the world, and crossed on their own stock, particularly their Navarrese, all the properties they desired might be attained. Now, be it known, I do not endorse all these notions. Perhaps the Emperor had occasion, at Waterloo to change his opinion as to the relative merits of his Navarrese horses in conflict with the English terrible greys. But so far as my experience goes, I underwrite for the sprightliness, activity, quickness of perception, docility, ability to bear fatigue, and courage of the Arabian; and these properties are very desirable to country gentlemen, who indulge themselves in riding to hounds, or prefer travelling on horseback to being jolted in the mail stages. This brings to my recollection an old stage contractor, who would have nothing to do with a nicked or cropped horse, and held the better the breed the better the steed. And if high breeding was necessary for the sandy roads of Virginia and Carolina, it will be found much more necessary on McAdam turnpikes. Your heavy coarse legged and hoofed brutes will be limping at all seasons, and in hot weather you may look out for thumps and high blowing.

There are some farmers, who are invincibly prejudiced against blood for farming horses. They are for the Dutch or English work horse. If they will be so good as to attend a moment I will introduce them to two varieties, which I think will better suit their views and purposes. They are described by an Englishman with his English predilections about him; and moreover, by an Englishman who is the best writer in the language on the subject of horses. "Where," asks the celebrated Nimrod, "where in England will you see what is every day seen here—a man take a powerful horse out of a cart, and gallop him along the road at the rate of twelve or fourteen miles in the hour? This description of horse, the light cart horse—light, yet very strong; on very short legs, and not more than fifteen hands in height—is far superior to any thing we have in England for such purposes as those for which he is used. Look for example at the cart horses that convey fish to Paris! What English cart horses would go their pace (considerably faster than that of the diligences) and keep up their good looks as they do? Then, what admirable animals are the black roan stallions we see on the roads leading from Paris, drawing the public carrying wagons! We have nothing in England that can at all compare with them in any one respect. They will out-walk our horses by a mile in the hour, and will live where ours would strave. I have often expressed my surprise that we do not avail ourselves of a cross from this excellent breed." He might have said breeds—the cart breed and the wagon breed. An Englishman will tell us to go to England for cart and wagon horses, but his countrymen are advised to go to France for them. Prejudice and ignorance aside, why may not we as well go to France? CROFTS.

CURING COCOONS.

For the Farmers' Register.

This is an important work, and should be well done. If the cocoons cannot be reeled immediately after they have been finished by the worms, they must be spread out, in layers of the thickness of a single cocoon, and exposed to the rays of the sun until the chrysalides are completely stifled. In dry weather, when the thermometer (Fahrenheit's) rises to 80 in the shade, this may be accomplished in six hours. The cocoons should be spread on frames or hurdles that have been covered with dark colored cloth or paper, and placed *on the ground*, and not at any elevation whatever. In dry weather exposure for one day *on the ground* will kill the chrysalides as effectually, as three days when the hurdles are elevated only two or three feet; and besides, when the hurdles are placed on the ground they are not liable to be overturned by high winds. If heavy rains have immediately preceded the time of exposing the cocoons to the rays of the sun, three days will be requisite to effect that which may be done in six hours, when the earth is quite dry. These are unquestionable *facts*, ascertained by careful experiments, but I am not prepared to assign *positively* the cause of this difference. I suppose however, it should be attributed chiefly to the great reduction in the temperature of the earth which usually follows copious rains.

Whether the chrysalides are killed, or not, must be ascertained by opening a small number of the thickest cocoons. If any of them should still be alive the cocoons should be exposed to the rays of the sun another day. After the chrysalides have been effectually killed, the cocoons must be spread out in a dry apartment, and suffered to remain in that situation for three or four weeks. They must not be thrown into bulk earlier than three weeks after the chrysalides have been killed. If this should be done immediately, fermentation ensues, the fibre is weakened, and the cocoons would not pay for the expense of reeling. When I speak of expense, I allude to *hired* labor. In families where there are females without profitable employment, cocoons of inferior quality might be reeled with advantage, and converted into sewing silk. I have recently reeled cocoons formed in July 1838, which were cured on the above-named plan, and the fibre appears to be as strong now as it was twelve months ago. LAYTON Y. ATKINS.

Stafford county, Va., Jan., 1840.

REMARKS ON THE EMPLOYMENT OF SALT IN AGRICULTURE. POUDRETTE. TREATMENT OF HORSES.

To the Editor of the Farmers' Register.

I wish you a happy new year.

Some years ago an essay was published by a person of the name of "Johnson" on the use of salt as manure, and I well recollect at the time, that there was considerable discussion on its merits, but the evidence adduced was of so contradictory a nature, that on summing up the *pros* and *cons*, I was fairly posed. To read Mr. Johnson one would almost set down the farmer who omitted the use of salt to his crops, as little better than an

idiot. The application was represented to be so cheap and *scientific*—there was such a neatness and even elegance about it, when compared with filthy dung—then it was so handy withal! You may rest assured, sir, and I think the majority of your readers will coincide with me in the opinion, that there is no reliance to be placed on these *short cuts to fortune*. "I should not wonder," said a friend of mine at the time, "but that the day will come when we shall be able to carry the manure for an acre of land in our coat pockets." The reply in substance was, if ever that time should come, that the waistcoat pockets would be large enough for the produce. What puzzles me most about salt is this: that it should promote the growth of what ought to grow, and *destroys* weeds, those *real blessings* to bad farmers; but how that which destroys, nourishes! That is another poser. Whatever may be the effect of salt on friable soils, I know from experience that on stiff loamy, or retentive land, it is very injurious. Such soils continue wet and close for many years after a dressing of salt. But what would with me be an objection against its use is, that it *destroys* the best *drainers* we have—the *common earth worm*. They are continually working up and down, and that to a depth greater perhaps than is supposed; every worm hole being a pipe leading to the drains, if any.

With respect to poudrette, another of those portable manures, it is well to be cautious. A number of certificates are going the rounds of all the agricultural periodicals, detailing its virtues, &c., plausibly enough drawn up to be sure, but still, I repeat, let the prudent farmer be *cautious*; we poor farmers have been, of late, among "*breakers*" too much. It is not to be inferred, however, that the writer would wish to consign poudrette, if *pure*, to the already large family of "*humbugs*." In the neighborhood of large cities where "*trucking*" predominates, I have no doubt but that it will be both a convenient and useful manure, but for regular farming, or to the great body of farmers in general, poudrette can be of little avail, even if it was attainable.

As regards the keep of farm horses, public opinion is now decidedly in favor of cutting their fodder, whether it be hay, straw, or a mixture of both. Yet notwithstanding the plan has so much to recommend it, I am perfectly convinced from observation that not one farm in one hundred puts it in practice systematically. The best criterion of the excellence of this plan, is the fact, that in seasons when the hay crop is short, farmers resort to it as a measure of economy, in order to make their stock of fodder hold out.

In the treatment of farm horses much difference of opinion prevails. Some not only house them, but keep them constantly clothed up in the stable. Of this method I by no means approve, for though it improves the coats of the animals, it renders them tender and exceedingly liable to cold. I give the preference to the Norfolk (Eng.) system, of letting them *run out*, as it is called, which means nothing more than leaving the stable door open into a yard always kept well littered with dry straw or stubble; and as a proof that this plan is more in accordance with the natural habits and tastes of the animals themselves, than warm close stables, it is a well known fact, that however cold the weather may be, they generally prefer the open

yard to going under cover, though they have the option of so doing. Care is necessary in this plan not to put too many horses together in one yard, and that there are no kickers amongst them. This is precisely the plan put in practice by your late valuable correspondent, G. H. Walker of Honesburg, near Philadelphia; and during my occasional visits to that lamented gentleman, I had frequent opportunities of making myself acquainted with the general excellence of all his farming operations.

The weather is extremely cold here, thermometer at zero this morning.*

Markets excessively languid and discouraging for farmers.

WILLIAM BOWKER.

Middletown, N. J., Jan. 1st, 1840.

PRESERVATION OF SILK-WORMS' EGGS. ICE HOUSES NOT THE ONLY MEANS BY WHICH THESE MAY BE PREVENTED FROM HATCHING.

From the American Silk Grower.

Those who design feeding silk worms from the *morus multicaulis*, planted out in the spring, should know how the eggs may be kept from hatching by the increased warmth of the season, before the leaves have attained a size sufficient to afford enough food.

Ice-houses have been mainly depended upon for this purpose, but the results of an experiment made by Aubert, manager of the Royal Domain at Neuilly, near Paris, show that silk-worms' eggs may be kept two years, and perhaps for a much longer period, without being subjected to a greater degree of cold than that which forms the natural temperature of the earth, namely, about 56, or 57° Fahrenheit. So that cellars, caves, and wells from which the atmospheric air is excluded, will answer, as depositories for the preservation of eggs as well, if not better, than ice-houses.

The following is a condensed account of Aubert's experiments:—Silk-worms' eggs, obtained from moths in 1834, at the regular season, were put into a small tin box which was deposited in a cellar at Neuilly. The temperature of this cellar during the greatest heat of August 1835 never rose above 11° Reaumur, or 57° Fahrenheit, nor did the eggs manifest the slightest indication of hatching. Having remained in the same situation during another season, they were, after a lapse of about 22 months, brought out and hatched by C. Beauvais, under whose superintendence they were reared with the most perfect success.

The results of this experiment makes us acquainted with some highly interesting and useful facts. It demonstrates clearly that silk-worms' eggs, require a temperature higher than that met with in the earth at the ordinary depths of cellars and wells, to give them the hatching movement, and consequently goes to show that the preservation of silk-worms' eggs can probably be more safely effected in cellars properly adapted for the purpose, than in ice-houses. These last are not

always within the reach of persons engaged in rearing silk-worms whereas almost every one can have access to a suitable cellar, cave, or dry well.

The place where the eggs are deposited should be closed or cut off so as to prevent the circulation of its air which will thus always remain at the temperature of the surrounding earth. A thermometer placed near the eggs, should be examined occasionally in the warm season to ascertain whether the temperature keeps sufficiently low. It will not do to trust to the feelings for this purpose, as a place may feel sufficiently cool whilst it is actually warm enough to cause the eggs to hatch out. To insure success the thermometer should never be above 56 or 57°. The eggs having once passed through their hybernation, a very short exposure to warmth will excite the hatching movement, so that handling or breathing upon the vessels containing them should be avoided as much as possible.

In asserting that silk-worms' eggs may be prevented from hatching, if kept at a temperature not exceeding 57° Fahrenheit, some explanation may be necessary, especially to those who, in their attempts at preservation, have had the eggs to hatch in vessels almost if not directly in contact with ice. The eggs designed to be kept from hatching must be deposited in the situation where they are to remain, either previous to winter, or at least some time before its close. This will prevent them from starting or getting a tendency to hatch for if this hatching movement ever commences, the worms must be suffered to come out at the natural period, and any attempts to restrain them from doing so will destroy the embryo insect in the shell, or injure it to such a degree that the worms will either die soon after hatching, or drag out a feeble existence. If they live to spin, their cocoons will be very indifferent. Silk-worms' eggs imported from Europe last winter and spring, generally turned out very unfavorable with those who attempted to preserve them for late feeding the past season. The reason of this may doubtless be thus explained. Eggs of the one crop race generally require to be kept over a winter before they are susceptible of hatching. After passing a whole or even a portion of winter, all that they require to raise in them the hatching movement is a proper degree of warmth, and this they meet with in crossing the gulf stream, the temperature of which is never below 70° even in the dead of winter. Silk-worms' eggs that have thus had the hatching tendency excited in them during their voyage to this country may serve very well for the first or early crop; but any attempts to keep them back for late feeding will end in disappointment as no degree of cold will answer which will not either destroy, or produce irreparable injury to the tender embryo. Not so however, where the eggs have been deposited in a cool situation previous to winter. For being thus prevented from acquiring any tendency to hatch they may be preserved so long as their temperature does not rise above 57° and would, perhaps, even resist one two or three degrees more. At the same time they receive no injury from exposure in ice-houses or refrigerators, to the lowest degrees of cold which they do after the hatching movement has once commenced.

All authorities upon the subject of preserving

* The next morning, January 2nd, in Petersburg, our thermometer was at zero, fifteen minutes before 9; and though not observed earlier, must have been 6 to 10 degrees lower before sunrise.

† Published entire in the *Annales de la Société Sericicole*, No. 1. p. 75.

silk-worms' eggs, agree as to the necessity of keeping them as dry as possible. This may be done by putting them into boxes or bottles and packing these away in larger boxes or barrels, the sides and intervals being filled with dry materials, such as shavings, charcoal, &c. Some persons think it indispensable that the bottles or boxes containing the eggs should be perfectly sealed before they are deposited. Among these we may mention Loiseleur Deslongchamps, who in France, was the first to introduce the plan of preserving silk-worms' eggs in ice-houses; each box or bottle should contain but a small quantity of eggs, leaving the largest space occupied with air.

SILK GROWING IN 1839. EXPERIMENT OF MR. AARON CLAPP, OF HARTFORD, CON.

From the Morris' Silk Farmer.

I planted, the second week in May, a lot of morus multicaulis mulberry trees on one acre and a quarter of good land, being rich loamy soil, by laying down the roots and trees without being cut, burying them about two inches deep. This I consider the best mode for planting multicaulis trees. The rows were three feet apart. I did not put any manure on the land, and the land being rather wet and also it being a wet season, only about half as many trees as I had expected were produced; those trees that did come up grew and did very well.

I then fitted up an old building which had been used for a store house, by putting up ladders or shelves, the boards being about 18 inches apart one above another. The house was 18 feet wide by 25 feet in length, and two stories high.

The second week in June I had a small crop of silk worms hatch, of the six weeks kind, which consumed from my trees 1,500 lbs. of leaves; and the first and third weeks in August I had a large number of the mammoth white hatch, and had flattering success with them.

The silk worms required attendance about seven weeks; the first three weeks I employed two persons, one to pick leaves and the other to feed the worms; the fourth and fifth weeks I employed four persons, two to pick the leaves and two to feed the worms; the sixth week two persons were sufficient, and the seventh week it required only one person.

I raised fifty bushels of excellent cocoons, and what I reeled produced one pound of silk to the bushel, which is pronounced by good judges to the better than the imported, and equally as good silk as any made from any other species of mulberry tree in our country. There was a larger quantity of foliage remaining on the lot than we had picked, and allowing that 100 lbs. of silk can be made from $1\frac{1}{2}$ acre of ground, and at \$6 a pound which is now the price of it, it would amount to \$600. Now there is no other species of mulberry tree that will produce the quantity of foliage from the same piece of ground, and there is no crop of any thing that will produce such a profit, and in so short a space of time. Even a whole farm of 200 acres of land will not produce more than \$600 annually, of ordinary crops.

Allowing that fifty pounds can be obtained from

one acre and a quarter of land, and in so short a space of time, it will be seen that the silk business can and will be made very profitable. I also weighed the leaves, and found that eighty pounds of multicaulis leaves will produce a pound of reeled silk.

The following will fully prove that the statement which I have given is not extravagant.

Capt. James Marsh of Hartford, raised this season one and a half bushel of cocoons from two square rods of ground, equal to $107\frac{1}{2}$ bushels to the acre, and at \$5 the bushel would amount to \$537 50.

S. B. Goodwin, of Wethersfield, gathered this season 3,575 pounds of multicaulis leaves from one-fourth of an acre of ground, equal to 14,300 pounds of leaves to an acre; and allowing that eighty pounds of leaves will make one pound of silk, it would produce 178 pounds and 12 ounces, and at \$6 a pound would amount to \$1,068.

Dr. Holt, of Glastenbury, obtained 70 pounds of multicaulis leaves at one time, picking from one rod of ground, equal to 11,200 pounds to the acre.

Mr. Church, of Bethlem, from five years experience in making silk from different species of mulberry, is fully satisfied that the multicaulis will make equally as good if not superior silk to any other kind. Mr. Church further states he had repeated obtained one pound of reeled silk from $8\frac{3}{4}$ lbs of cocoons, although it can cannot generally be expected.

Now, with a convenient cocoonery and additional help of two individuals for two weeks, I could raise a crop of one million of silk worms with the same ease and in the same length of time specified above. The building which I occupied was very inconvenient, and also we were very careful not to injure the trees when picking the leaves. The leaves were all picked one at a time, and some of the leaves were $12\frac{1}{2}$ inches wide and $13\frac{1}{2}$ inches in length. Now when there is a sufficient supply of multicaulis trees in the country, so that there would be no sale for them, we should gather the foliage by stripping off the branches and the leaves together, and in this way might gather the foliage four or five times as fast.

Several individuals in this vicinity have made silk this season from the morus multicaulis, with good success, and the specimens of silk that have recently been exhibited at the American Institute, gives undoubted evidence that this species of mulberry tree makes equally as good silk as any other kind. The morus multicaulis possesses very decided advantages over all other kinds of mulberry.

MILLET.

From the Mississippi Farmer.

Near Jackson, October, 1839.

Dear Sir:—Your favor relative to the cultivation of millet in this State, is received; and I will with pleasure furnish you with the result of my experience:

In the fall of 1838, I procured from a friend in Alabama, one peck of seed, and which I sowed last spring as directed by him. I had previously learnt in a trip through Kentucky and Tennessee, the estimation in which it was held by stock-raisers

in those states. Many of them assured me that it yielded from eight to twelve thousand pounds of hay to the acre. And though the food is coarse and rough, yet its astonishing product seemed to me to render its cultivation expedient for our mules and oxen and cattle generally, if for nothing more. Our winter range being pretty well exhausted, it is indispensable that we provide rough forage for our stock, from cultivation.

I sowed the above peck of seed on about three acres of ground after breaking it with the plough both ways, and harrowed it in. One fourth of a peck the acre is probably sufficient; and the first of March the proper time for sowing. It should be cut when fairly headed out and in milk, for hay which, in ordinary seasons, will be in July. Such as is kept for seed, must remain until it fully matures. From those three acres I have cut upwards of fifteen thousand weight of hay, and find that horses, mules and cattle are very fond of it.

I am much pleased with its cultivation, and shall enlarge my crop. It seems to me preferable to oats; because it yields more, and is better winter food.

R. A. P.

CAUSES OF SEEDS NOT GERMINATING.

From the Cultivator.

We have known and heard of considerable loss and disappointment from seeds, particularly onion seeds, not growing. We have thought and inquired in reference to the cause, and the result of our cogitations and enquiries may be thus stated:

Without a certain degree of moisture, seeds will not germinate. On dry, sandy soils, and in a dry season, it seems highly probable, then, that seeds may be deprived of the requisite degree of moisture; perhaps receiving just as much as will mould them and destroy their vitality, or being so near the surface as to be injured by the sun's heat and light.

But the seed may have germinated, and have commenced to send out their roots and stem stalks and yet be destroyed. If the soil is not pressed closely to the seeds, and very dry weather occurs just at this period of the process of germination the root being too distant from the soil, and too feeble to draw any supply of moisture, the liquid food of the plant contained in the fermented seed may be dried up, and the life thus destroyed.

If you would avoid disappointment and loss from seeds failing to grow, the preventive process is indicated by a knowledge of the causes most frequently productive of this result, which we think are those stated above. If you sprout your seeds before putting them into the ground, you will preserve them from the first cause of failure, but if you pulverize your soil thoroughly and press in this state with a hoe, spade, or roller, upon the seeds thus sprouted, the root stem will soon and surely derive sufficient moisture from the soil.

In a few instances I have found my neighbors blaming the seed as useless, particularly of onions, carrots, and parsnips, when I have obtained a little of the seed and found it to sprout quite well. You may easily save yourselves from such reflections, or from the temptation to blame others, by steeping the suspected seed in warm or tepid water, from six to twenty-four hours, according to the size and hardness of the seeds, and then

setting it away in a warmish place for a day or two. If good it will sprout in this time; if kept warm in a darkish place, and it does not sprout in this time, the seed is faulty.

In connexion with this subject, I may state that several circumstances incline me to the belief that corn which has been sprouted—no matter in what steep—is safe from the ravages of the red or wire worm. It has been fashionable to steep in a strong solution of copperas, and to ascribe the safety of the seed in this state not to the change which fermentation has produced in the germ or chit which is usually first attacked, but to the change in the taste from the copperas. We have known corn soaked in simple water—in water alone—to escape from the attacks of the worm as well as that soaked in a copperas steep. Until this matter is made more certain, however, I would hold it bad husbandry to neglect the copperas, as in addition to the change produced by heat and moisture, we have also the disagreeable taste communicated by this salt.

THINNING OUT THE LEAVES OF VINES INJURIOUS TO THE FRUIT.

From the Annales d' Hort. de Paris.

Mr. Brassin, the manager of the celebrated vines at Thierney and Fontainbleau, does not thin out the leaves to ripen the fruit, as is too frequently done by many who cultivate grapes. When the fruit is full grown, instead of thinning the leaves, which shade the fruit from the sun, as is the common practice—which is so injurious, that the more the leaves are removed, the less the fruit ripens—he takes away the leaves between the grapes and the wall, in order that the heat of the sun may be reflected by the wall on the grapes. M. Poiteau truly observes that no leaves can be safely removed by any one who does not possess some just notions of vegetable physiology.

THE COTTON CROPS OF THE WORLD.

From the Philadelphia Inquirer.

There is no subject connected with commerce or agriculture, which possesses a higher interest for the citizens of the United States, than the production and consumption of cotton. We have, on more than one occasion, devoted our columns to the insertion of information upon the subject; and our attention is particularly called to it just now, in consequence of a recent publication of a valuable letter, signed "Cotton Plant," in a spirited New York paper, called "The Whip." The writer commences by stating that the entire growth of cotton in the world is set down at 1,000,000,000 lbs. Of this 550 millions are supposed to be grown in the United States, 30 in Brazil, 8 in the West Indies, 27 in Egypt, 36 in the west of Africa, 190 in the west of Asia, 35 in Mexico and South America, except Brazil, and 14 millions elsewhere.

Thus, at 10 cents per lb., a price below which it has rarely ever fallen, this crop is worth 100,000,000 dollars. For the last fifty years, however, the value (though often fluctuating suddenly and widely) has averaged 19 1-2cts. At this price the

present growth of the world is worth \$192,500,000.

Of this, about 350 millions of pounds are consumed and manufactured in England, about 150 millions in the U. States, 80 in France, 250 in China and India, 25 in S. America and Mexico, including Brazil; 35 in Germany, 45 in Turkey and Africa, 10 in Spain, 20 in Russia, and the remainder elsewhere.

The value of cotton manufactures in England is believed to be annually about 170 millions of dollars; in France at 70 millions; in the U. States at 60 millions.

The capital employed in manufacturing by machinery, is estimated in England at 200 millions of dollars; in France at 120 millions; in the U. States at 110 millions.

The consumption in manufactures of raw cotton in all Europe, in 1803, was estimated at only 60 millions of pounds. (Dic. of Span. Com.) The whole consumption in Europe, in 1830, was about 387 millions of pounds. In 1838, it is believed to be nearly 500 millions of pounds.

South Carolina and Georgia were the first states in this union to grow cotton to any considerable extent. In 1791, two millions of pounds were grown in the union—one and a half million of which grew in S. Carolina, and one half million in Georgia.

In 1801, forty millions was the crop of the United States—of which 20 millions grew in South Carolina, 10 in Georgia, 5 in Virginia, 4 in North Carolina, and 1 in Tennessee.

In 1811, the crop of the U. States had reached 80,000,000—of which 40 grew in S. Carolina, 20 in Georgia, 8 in Virginia, 7 in N. Carolina, 3 in Tennessee, and 2 in Louisiana.

In 1821, one hundred and seventy millions of pounds were growing in the union, as follows; 50 millions in S. Carolina, 45 in Georgia, 20 in Tennessee, 20 in Alabama, 12 in Virginia, 10 in North Carolina, 10 in Louisiana, and 10 in Mississippi.

In 1828, the whole crop of the union was 348 1-2 millions. Of this Georgia grew 75 millions, South Carolina 70, Tennessee 45, Alabama 45, Louisiana 88, Mississippi 20, Virginia 25, North Carolina 18, Florida 2, and Arkansas one half of a million.

In 1838, the crop of the union had increased to 437 3-4 millions. Of this, 88 millions grew in Georgia, 73 in South Carolina, 70 in Mississippi, 65 in Alabama, 55 in Louisiana, 50 in Tennessee, 15 in Florida, 13 in Virginia, 10 in North Carolina, and three fourths of a million in Arkansas.

The next year, 1834, the crop had increased to 457 1-2 millions, and was grown as follows: 85 in Mississippi, 85 in Alabama, 75 in Georgia, 65 1-2 in S. Carolina, 62 in Louisiana, 45 in Tennessee, 20 in Florida, 18 in Virginia, 9 1-2 in North Carolina, and in Arkansas one half a million. Subsequently, no certain data are in our possession; but the estimate at this time, is 550 millions as the whole crop of the union.

Thus it will be seen, from 1791 to 1826, S. Carolina was the most abundant cotton growing state in the union. In 1826, Georgia took the lead, and held it till 1834, when Alabama and Mississippi took the front rank. At this time, Mississippi is perhaps the most extensive cotton growing state in the union. South Carolina and Alabama are next. North Alabama, is beginning to deteriorate as a

cotton country while the worn lands in middle Tennessee are thought to improve for this culture—maturity, the vital desideratum, not being so easily allowed in the rank luxuriance of the fresher soils.

When it is remembered that the first cotton plant in the United States was raised in 1787, surely our readers will find reason for surprise at the wonderful increase that has accrued in little more than fifty years! Bold, indeed, must be the man who would venture to predict the wealth, greatness and power, likely to become our national attributes through the agency of cotton.

PROCEEDINGS OF THE SILK SOCIETY IN NORFOLK.

On the 23d Dec. 1839, at 11 o'clock, A. M. at the Eagle Hotel, in Norfolk Borough, according to their previously expressed resolution, an adjourned meeting of the Ruffin Silk Society of Eastern Virginia took place; and the Rev. George Jones, president of the Society being installed into office, briefly stated the business of the day, and called for the several reports of the committees.

The adoption of a constitution being of primary importance, the committee appointed to draft that document immediately reported as follows.

Constitution for the Ruffin Silk Society of Eastern Virginia.

Art. 1. This Society shall be called the '*Ruffin Silk Society of Eastern Virginia*;' the object of which shall be to promote the production and manufacture of silk in the State of Virginia.

Art. 2. Every person may become a member of this society by signifying his desire to the corresponding secretary and paying into the treasury any sum not less than one dollar, and the same sum annually.

Art. 3. The Society shall meet quarterly at such time and place as a majority of the members in any meeting shall appoint as well for the transaction of business, as to the end that they may exchange courtesies with other similar associations; and hold also, a 'silk fair,' annually.

Art. 4. The officers of this Society shall be a President, six Vice Presidents, a Recording Secretary, a Corresponding Secretary, a Treasurer, and an Executive Committee, of which three shall form a quorum, to consist of the President and corresponding secretary, *ex officio*, and five members; all of whom shall hold their offices till others be appointed.

Art. 5. It shall be the duty of the President to officiate at the meeting of the society to perform the duties assigned to that office; to appoint committees, and to deliver an address before the Society on the great objects and interests of silk, at the meeting succeeding that at which he was appointed.

Art. 6. It shall be the duty of the Vice Presidents to report to the President, one month preceeding each annual meeting, the progress and condition of the culture of silk in their several counties and towns; also in the absence of the President, or during a vacancy of that office, the Vice Presidents shall perform the duties of the chair, respectively in their appointed order.

Art. 7. The Recording Secretary shall keep the books and papers of the Society; and shall record its proceedings.

Art. 8. It shall be the duty of the Corresponding Secretary to conduct the correspondence of the Society, and cause to be published such papers and documents as the Executive Committee shall direct.

Art. 9. The Treasurer shall take charge of the funds of the society, and pay them out on the order of the Executive Committee. He shall also receive and dispose for exhibition all specimens of machinery or of silk produced for premium or exhibition, and shall furnish his account annually.

Art. 10. It shall be the duty of the Executive Committee to devise and execute plans for the promotion of the interests of the Society. They shall make a quarterly report of their proceedings; shall recommend measures for the adoption of the Society, and shall award premiums and medals under the regulations of the Society.

Art. 11. The Society may elect any number of honorary members, who may meet and deliberate but not vote with the Society.

Art. 12. No less than one fifth of the members shall constitute a quorum for the transaction of business at any regular meeting.

Art. 13th. This constitution may be altered or amended by a vote of two thirds of a quorum on a recommendation of the Executive Committee requesting such a proceeding.

The above articles being separately received and adopted in their present form, the secretary was ordered to record the same and obtain the signatures of the members. The president then called for the report of the committee appointed to draft an address to the people of Virginia on the silk culture, and the following appropriate and admirable paper was produced, read, received and unanimously adopted, to wit:

Fellow citizens of the commonwealth of Virginia:

Twice within a few years, has our country been made to suffer from a terrible revulsion in monetary affairs, and both times from the same cause—the inequality of exchanges between Europe and ourselves. Our imports vastly exceed our exports; and while we suffer this to be so, we shall ever experience the fate of debtors. Temporary indulgence, and then a pressure and distress, this recurring again and again at the interval of a few years, will be our history until we can produce a balance of trade and thus relieve ourselves from the necessity of a debtor's thralldom. The great staple of cotton effects much for us; but some other staple equally great is yet needed; for our cotton is found to come far short of the necessities of the case.

The object of this address is to show that silk may be made this great subsidiary staple equal to all our wants: and there is also another consideration which induces us to appeal strongly and especially to you as Virginians.

Be the cause, what it may, whether from wearing out of our soil, or a change in society, the fact itself is apparent that a large portion of our most valuable citizens are deserting us! Any one who, in summer, will travel the great thoroughfare from Staunton to Guyandotte will find it filled with movers, hastening to seek new homes in the far west, and these, too, persons of substantial means and of hardy but disappointed enterprise. Our state is thus subject yearly to a withering up of its energies and we have great reason to ask—what shall be the end of this?

We propose to show in this address that more

money may be made from an acre of the poorest land in the state than from a similar quantity in any of the vaunted regions of the West. And to the point.

1. *Silk can be made in this country equal to any foreign production.* Before our revolutionary war it was an article of export and then commanded in the English market from 2s. to 2s. 6d. more than Italian silk: subsequently to that period silk raised in Connecticut was pronounced by one of the largest manufacturers of England equal to any that he had ever seen. And within the last year fibres from American cocoons have been brought to a fair test with those from cocoons raised in Italy and have been found to be of superior strength. American sewing silk is also declared by our toilers to be better than that raised in Europe.

2. *The climate and soil of Virginia, particularly in the immense sandy region extending from the seaboard to the mountains, are remarkably well adapted to the production of silk.* Its reputation for the successful cultivation of the mulberry tree has become such as to make it resorted to for this purpose, from as far north as Boston, and repeated experiments have shown that the poorest lands of this state with a little aid from manure produce trees surpassing in size even those raised in the rich prairie lands of the West. A dry sandy soil also produces leaves more nutritive and more healthy to the worms than any other, and with such soils we are amply provided. Our climate is also admirably adapted to the silk worm, a dry and warm climate being found most conducive to their health and to the speedy termination of their labors.

3. *This is a business which offers to the produce of inland and remote places, an easy access to market.* A thousand dollars worth of silk may be packed in a good sized trunk and carried in a stage, and whatever mode of transportation may be chosen, the cost of freight will be comparatively trifling. The mountainous and distant parts of our country now shut out from enterprise by the difficulty of reaching a market for their produce are in this respect nearly on an equality with the seaboard. The many thousands of square miles in this state inaccessible to rail road, or good roads of any kind, will feel the real importance of this consideration.

4. *The most important item of all in this matter is the very great profit which it offers to those who will engage in it.*—Upon this subject, careful experiments have been made in various sections of the country; and although the results have differed as to the precise amount of profit, yet it is clear that no other agricultural occupation known offers such a certain and profitable return as this. A result obtained by the Rev. D. V. McLean, of Freehold, New Jersey, will be copied here because it is amongst the most moderate, and also because it has been obtained after the most careful attention to statistics during the whole process of the silk raising. This gentleman, last spring, selected, for experiment, a quarter of an acre planted this season with *morus multicaulis*, about two-thirds of the planting being in roots, the balance in layers, both of them small and of the previous season's growth. The rows were 2½ feet apart; and the whole growth in the quarter of an acre, large and small, was 5,500 trees, their average size attained during the summer being 3½ feet. From these, after leaving sufficient for the support of the trees,

he gathered 2,576 lbs. of leaves, sufficient, as his experiment showed, for a full supply for 40,000 worms. These worms gave him 130 lbs. of cocoons, from which he procured 12 lbs. of merchantable raw silk, together with 1 lb. of wastage and 1 lb. of floss silk, with a residue of 4 lbs. of defective cocoons. We quote now from the letter of the Rev. Mr. McLean itself.

"The above shows us 48 lb. of reeled silk, 16 oz. to the lb., as the product of an acre. If this is worth, as I understand it now is, \$6 per lb., then the gross proceeds of an acre will be \$288; the first year, let it be remembered, or if it should be worth but \$4.50 per lb., which is undoubtedly the safest price at which to rate it, the gross proceeds of an acre will then be \$216.

In regard to the cost of production, it is confidently asserted by many, that it can be produced for \$2 per lb. Mine cost me much more than this; my experience, however, satisfies me that it can be produced for \$2.25 per lb., and I incline to the belief that it may be produced for \$2. Produced on the farm in a small way, the cost will be next to nothing—the whole produce will be clear gain. Now take the product of an acre as above stated at \$288, and allow this to be made at an expense of \$2 per lb., you have a net profit of \$192 per acre!! Allow the cost of production to be \$2.25, and you still have a net profit of \$180. Again, take the product at \$216 (allowing the silk to be worth only \$4.50 per lb.) and let the cost of production be \$2, it gives a net profit of \$120 per acre; but allow the cost of production to be \$2.25 per lb., the sum at which I know it can be made, and it still affords us a net profit of \$108. This last I am persuaded, will be found more nearly to correspond with actual results. If the price of the silk is more than \$4.50 per lb., and the cost of production less than \$2.25, so much the better for the culturist."

We believe that any person can with entire safety take these estimates as data on which to form his expectations from the silk-raising. They are the lowest which we have seen, and in several items, we know from our own personal experience and observations, that results have been obtained more favorable than those stated in Mr. McLean's report. His trees, principally from roots, averaged half a pound of leaves each; while, in this state and in ordinary soil, we know from actual trial that trees can be raised from cuttings of one bud, from which more than a pound of leaves can be gathered the first year. We procured this summer, at one gathering, even two pounds of leaves from a tree grown from a single bud cutting planted last spring, but this was in soil unusually rich. Again, Mr. McLean's cocoons required, of the mammoth white, 317 of the average, and 288 of the largest, to make a pound; his sulphur cocoons averaged 300, and of the largest 247 were required for a pound. We have seen in this state, the common sulphur, raised without extraordinary care, require but 259 in the average, and 134 of the largest for a pound. And the Messrs. Herr, of Lancaster, Pa. have raised them this season so as to require but 99 of the selected and 180 of the average for a pound of cocoons. It would be pleasing to us to enter more into details on this subject; but we are forbidden by the limits of such an address, and as the safest data, we recur to the results of Mr. McLean's experiment. It should

be borne in mind, however, that this was made the first year after planting, and that for the profit of subsequent years, we must add accordingly to the increased size of the trees.

Fellow citizens of the commonwealth of Virginia:—A great enterprise is laid before you. It proposes to save our country from those appalling revulsions which threaten to be periodical and frequent, leaving dread during their absence, and when they come, prostrating every thing before them. We have but one feasible security from them, and that is by creating a staple capable of producing a balance of trade between Europe and ourselves. Our imports of silk amount to \$20,000,000 annually. We can not only make this silk at home, but by the same article we can make England and the continent of Europe annually our debtors to an amount between 30 and 50 millions of dollars. This may sound extravagant, but we beg to remind you that in 1791, the quantity of cotton exported from the United States was but 188,316 lbs., and that it would have appeared equally extravagant then to say that in 1838 the exports would be upwards of 630,000,000 lbs. The prospects, both for success in raising, and for profit in the silk culture, are now incomparably better than they were as respects cotton in 1790, when it too was looked upon by many with contempt. It is already decided that we can make silk, and of a quality that will insure it a ready sale in foreign markets. Let us cherish and encourage its cultivation. Let us press it into our service as a matter of great national consequence, and break off this degrading dependence on foreign creditors; this painful hanging by the eye-lids till the next steam ship arrives to tell us—what? that our bills are dishonored and our merchants bankrupt. Virginians! this commonwealth was once the highest in the list of our national confederacy. Shall we retrograde while all others are advancing? Look again at the streams of emigrants pouring westward; they say that our soil is hopelessly impoverished; they are mistaken. This soil, these sandy wastes may be turned into fruitful gardens, and may be made to smile under a dense and happy population.

And the man of humane feelings, as this great cause advances, will rejoice to see it, while proving a great blessing to the nation at large, still more emphatically the friend of the poor and the infirm. It will give profitable employment to the aged, to women and children, to many thousands who are now suffering all the ills of prolonged and cheerless poverty.

Then let every good man and every well-wisher of his country, give it an approving look and a helping hand. The cause is assuredly worthy of both.

GEO. JONES.
B. POLLARD.
J. W. MURDAUGH.

On motion, *resolved*, That the stated meetings of this society shall be held on the first Wednesday in February, May, August and November of every year.

Resolved, That the stated meeting of November shall be the annual meeting for the election of officers and the exhibition of specimens in any branch of silk culture or fabrication.

Resolved, That the corresponding secretary be

required to correspond with gentlemen interested in the culture of silk in Richmond, and request them to form a society and co-operate with us in petitioning the legislature to appoint a committee for the purpose of investigating the subject.

Resolved unanimously, That Edmund Ruffin, esq., editor of the 'Farmers' Register,' and Gideon B. Smith, esq., editor of the 'Journal of the American Silk Society,' be admitted honorary members of this society for life.

Resolved, That the editors of the Norfolk and Portsmouth papers, of the Farmers' Register, and of the Journal of the American Silk Society, be requested to publish these proceedings.

Resolved, That this meeting do now adjourn, till the first Wednesday in February, 1840, to meet at 11 o'clock A. M. at the Eagle Hotel in Norfolk Borough. GEO. JONES, Pres't.

THOS. G. CLINTON, Recording sec'y.

Corrected extract from the minutes of the Ruffin Silk Society of Eastern Virginia.

Teste, E. C. ROBINSON, C. sec'y.

EDITORIAL REMARKS.

A place is given above to the recent proceedings of a society, the first established in Virginia, for the promotion of silk-culture. In this respect alone, its formation and early procedure would require some notice and comment. And in return for the complimentary notice, and honors conferred on us, by this new society, we will here offer, with our thanks, to the members some *advice*—though it be the kind of offering which is generally the least desired, and least acceptable.

To promote, extend, and establish silk-culture in Virginia, as a common and profitable branch of agricultural investment and domestic employment, is a most noble and valuable object; and, at the same time, as we firmly believe, and have long and often tried to enforce, is an object that is perfectly and cheaply attainable. And all that is now wanting to reach this end, is *light on the subject*, to be furnished in carefully and accurately conducted experiments; and by practical rearings of silk-worms on a scale of operation more or less extensive, according to the previous practical knowledge gained by the earlier experimenters. It is in this manner that this society can most effectually and certainly forward the object in view, and, to an amount a thousand-fold exceeding their out-lay of money and labor, promote the agricultural and general interests of Virginia.

So far, the society has done well, and in the measures proposed, it designs well. But this is not enough. If the members merely comply with the requirements of their constitution, the society will remain in the rank of most of the agricultural societies which have been formed in Virginia, and which have been, in the general, as useless in fact, as, if properly operating, they ought to have been profitable to their members and valuable to

agriculture and to the country at large. The usual acts of the life of an agricultural society in Virginia, is first to publish its organization and constitution—next to hear and to have published an address on mere generalities, teaching nothing practical, and worth nothing, unless perhaps merely as a literary composition—and next, and perhaps speedily, the society falls into a torpid state and then dies. It is only in the *work performed*, the *practical information elicited and diffused*, and especially by the means of *actual experiments*, accurately conducted and fully reported, that a society can be greatly useful, or even maintain a respectable station, as a promoter of agriculture in general, or of the one particular department of silk-culture.

It is therefore, and because of the great interest felt in the procedure of, and the hope of good fruits from, this new silk society, that we earnestly urge upon its members that, in addition to all yet done and proposed to be done, they shall make it essentially and truly a *working society*. Let the society show *good works*, in the industry designed to be promoted, and they will dissipate all existing doubts of value, and induce thousands of other individuals to follow their example. But if they rely merely upon their *faith*, and upon preaching it to the community, no matter how lively it may be to themselves, it will be dead, as to effect on the public.

In accordance with this general view, we respectfully recommend such operations as have been hastily suggested to our mind since reading the proceedings of the silk society.

Fortunately for the object in view, the environs of Norfolk and Portsmouth are now most abundantly stocked with *morua mulicaulis*, and no where can food for silk-worms be more cheaply procured during the approaching season, whether by those who are already proprietors of the trees, or by purchase from them of the leaves. Now, besides the larger and more systematic operations of the society, let every individual member of it carefully conduct a rearing of silk-worms, (no matter on how small a scale, if his situation forbids a larger,) and note and report the progress and results. Perhaps each one may object, to such an attempt, either the unfitness of a town location, the other more pressing demands of business, the want of a proper house, or of the very best arrangements and fixtures. It is true that some one, and sometimes all of these objections, may apply to every individual; and it is true enough that no resident in a town could conduct silk-culture so cheaply and profitably as in the country. Still, for such preliminary trials, there are superior advantages to be found in towns, and in the intelligence and concert, and

opportunities for mutual instruction of townsmen. Apartments of any size can be obtained for a temporary use; materials and workmen are ready; and labor and ability to conduct can be also commanded. All new experiments must necessarily be made at greater cost than well tested and established operations of like kind. Let these experiments have every necessary care and attention, but let the fixtures be as humble and as economical as possible. Every such feeding would in fact have the precision of an experiment in mechanical or chemical philosophy, and the value of the results could be estimated with a sufficient degree of accuracy, for larger practical operations for profit, even though the time and attention bestowed on the experiment might cost ten times as much to the experimenter as would be compensated by the sale of his first year's products.

If, in the absence of all better or more extensive means, 1000 silk-worms were fed and reared on a common dining table, set out in any common apartment, (and nothing can be more convenient, or secure, for so small a rearing,) the trouble and attention necessary for so small a number, would be, in proportion, ten-fold greater (perhaps fifty-fold) than would be required for a million. The necessary labor, however, could be correctly estimated from other experiments, as also the quantity and cost of food, of house-room, fixtures &c. But this very small experiment could, as well as any larger, serve to show the other important facts of the health, vigor, and products of silk-worms in a certain and stated temperature, and under other certain circumstances. And this, at least, might be done, and form an agreeable and amusing occupation to some lady, in each of 500 different house-holds within the sphere of action and influence of the society.

Those members who have sufficient means, should conduct, or cause to be conducted, much larger rearings, say from 5000 to 20,000 silk-worms; and those who have not only the means, but some little experience also, should extend their operations much farther, and aim at gaining some profit in money, as well as in knowledge, for future operations.

These separate experiments of individuals correctly observed and reported, would be subsidiary to the larger and more full and perfect experimental operations of the society. These should be the establishing a laboratory in the best or most approved manner, and the conducting sundry different rearings, of various sizes, and at successive times, and also in different modes; causing every necessary care to be observed, all doubtful processes to be tested, and every fact bearing on results to be observed and noted, and the whole results to be fully and faithfully reported. Such a course of

procedure would in a single year gather a body of facts which would serve completely to establish the value of silk-culture in Virginia; or, if that opinion be indeed unfounded, then these results would render the next most valuable service to the country, that of dissipating the delusion on this subject, under which we, as well as the silk society, are now laboring. But though to find truth, which ever way it may direct, is always valuable, still we entertain no question that the former would be the place in which it would be found.

From experiments it would be absurd to count on results profitable in a pecuniary point; and the more laboriously, carefully, and accurately conducted, they may be, of course the greater will be the cost, and therefore the greater the balance of pecuniary loss, even when the gain in more important respects would be so much the greater. We are not so foolish as to anticipate, nor so dishonest as to promise, from the general results of all the procedure recommended to the society, any profit in money, in the first year. On the contrary, if the members, severally and jointly, should not lose (or be out of pocket,) as much as \$1000 on their feeding operations of this year, it will be because of too limited action, and therefore much to be regretted. But by generously submitting at first to that, or a double amount of loss, we firmly believe that they would be gainers in the end; and that by a first judicious loss of some thousands, the commonwealth would gain more than as many millions of dollars.

Most earnestly do we hope that the young society which has paid so much respect to our name, and to our zealous yet poor services to the promotion of silk-culture, may also pay some respect to our advice. If it is adopted, in general, and in the spirit, (no matter as to the particular mode or details,) this society will not only serve its designed and direct object most admirably, but will, as a truly *light-diffusing and working society*, set an example to most of the agricultural societies which are yet barely alive, (and upon paper only,) and to all others that may be established for more useful purposes hereafter.—ED. F. R.

AGRICULTURE IN KENTUCKY.

From the American Farmer:

Frankfort, Ky., Dec. 19, 1839.

Dear Sir:—I have delayed answering the enquiries embraced in your letter from Lexington, in consequence of absence and a wish to be better advised upon two or three of your questions.

The object of your letter being a wish to obtain such information as I may be able to give upon the agriculture and breeding of stock in this section of the state, particularly upon rye, our blue grass pastures, mules, sheep, hogs, hemp, corn and cattle, I shall endeavor to do so from the best

information I have, and which could be obtained from others.

Rye is extensively raised. We sow the latter part of August and first of September, one to one and a half bushel per acre, in our corn fields; plough it in with the shovel-plough or cultivator. If the season be favorable the greater part of the fall will produce good grazing for calves and young colts, and at times sustaining them through the winter with the aid of a small quantity of fodder or oats. It is not, however, until the month of March and April, that we receive the greatest advantage from it. At this season stock is generally in great want of green food, and they are frequently sustained from the 10th March to the 20th April, without detriment to the succeeding crop of rye. Stock of any description which may have access to a good rye field in the spring, will generally improve rapidly in their condition, and places them in fine health to go upon our blue grass pastures. When the grain is ripe or nearly so, a large portion of our rye fields are fed down by our hogs. Occasionally cattle, horses and mules are turned in with the hogs. It is not considered a productive crop, from 12 to 15 bushels per acre being a fair average crop upon lands producing forty bushels of corn per acre. No manure or topdressing is ever used.

The grazing in the fall and spring we consider pays well for the seed and sowing. Some of our best farmers sow it instead of clover, for the purpose of renewing their exhausted lands; when fed off by hogs, the immense quantity of straw and manure left on the ground, leaves it in fine condition for the succeeding crop.

Blue Grass Pastures—They are not of spontaneous growth—no regular system is considered necessary in making them. In our open fields, the usual practice is to sow timothy, clover and blue grass seeds mixed. Two or three good crops of hay may be taken before the blue grass gets well set. In our woodlands the seed is scattered promiscuously with a portion of timothy and clover seed. It is equally as advantageous and frequently practised to feed our hay upon the open grounds in the winter and spring, when we want to make grass. The stock will then tread in the seed, and we most always succeed in having it well set. After it is well set, it can never be exhausted by grazing. Briers will destroy it when neglected, by excluding it from the sun and air. It requires from two to three acres to fatten a bullock, and if good will keep him 8 or 9 months in the year.

Mules are raised by our farmers from their work mares. Few mares are kept exclusively for the breeding of mules. In the fall when the colts are ready to wean they are generally sold by those who breed them to those who feed them, until the fall after they are two years old, when they are then considered ready for market, and either drove on account of the feeder, or they pass into the hands of others who drive to the southern markets. South Carolina, Georgia, Alabama and Mississippi, constitute our principal markets.

Not many have been retained amongst our farmers for agricultural purposes. They commanding a more ready and higher price our farmers prefer selling them and retaining their horses.

Very great objections have been made to the breed-

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ing of mules from the uncertainty of getting colts. Three out of five would be considered a full proportion—possibly much of the difficulty arises from mares not being regularly sent, being work mares farmers may not be so particular in sending them at the proper time. Our stock of mules have greatly improved in a few years frequently having them 15 to 16 hands high; this improvement has been accomplished by better keeping, more care in the selection of the mares, and still more by a proper selection of the jacks. When sold in the fall after two years old, the fair average price might be considered from 55 or \$70—when three years old they frequently command from \$80 to \$100; not many, however, are retained until they are three.

Sheep receive but little attention from our farmers—a cross upon the common sheep with the merino prevails in Kentucky. I know of no full blood South-down—we may, however, have a few. The large New Leicester sheep have been introduced here within the last seven years; their great size and aptitude to fatten, have caused them to be highly prized by those who have them.

No country can be better adapted for sheep than this; with care they are subject to but few diseases. We want nothing better for them, summer and winter, than our blue grass pastures. In wet cold weather the weaker animals do better with open sheds, and fed with oats or clover hay. Our rye fields in the spring for ewes and lambs are invaluable. Farmers have occasionally fed them through the winter for the Louisville, Cincinnati and New-Orleans markets; they generally pay well in spring. Dogs are our greatest enemy in raising sheep; until we can have some laws or regulations upon the subject, little can be done safely.

Hogs are more generally and extensively raised for market than for any other stock; it is one suited to the capacity and business of most all farmers. Connected with the feeding of cattle they are indispensable: it is through them that much of the profit is derived. The corn that passes through two large bullocks will fatten three hogs without any other food during the winter.

We have multiplied our breeds of hogs rapidly within a few years. The Berkshire, Bedford and Irish hogs are the three favorites; each have their advocates. They all fatten kindly and come to early maturity. A pair has been introduced from New-York called the Leicestershire, imported into that state a few years since. They appear to be similar to the Irish hog and those imported by R. D. Shepherd, of Baltimore. We also have a few called the Rhinoceros; they resemble the Berkshire in color, but not in form; they are great favorites with those who have them. With care and judgment in breeding, our present stock will answer all the purposes requisite for early maturity, aptitude to fatten, and capacity to travel to market.

Hemp is an important article with us; it is sowed the last of April and first of May, requires the best ground, and that to be well prepared before sowing. Our blue grass pastures or old meadows broke up in the fall, well ploughed and harrowed in the spring, have been considered our best ground for hemp. The average quantity of seed used in sowing is 1½ to 1¾ bushel per acre. The ordinary quantity raised per acre is

about 600 lbs., tho' 900 and 1000 lbs. have at times been produced, which usually sells at five and six dollars per hundred. Nothing requires more care in the preparation of the ground before sowing. Its subsequent management of pulling and breaking requires very heavy labor; none but our strong able negro men can handle it to advantage. Very little is exported, being mostly manufactured in the state into bale rope and bagging. It is not considered an exhausting crop; from ten to fifteen crops in succession have been taken off the same ground without any material variation in its production. It is of rapid growth, and soon protects the ground from the influence of the sun, that connected with the superior order in which the ground is prepared for sowing, and the care taken in preventing all stock from trampling in winter, would keep our best lands in good condition for hemp fifteen years without the aid of manures. Its culture and manufacture may be considered disagreeable but not unhealthy, unless from the quantity of dust arising from it, persons inclined to consumption may be more exposed, than when engaged at other occupations.

Corn is our great staple, upon it we depend to fatten our horses, mules, cattle and hogs, as well as for bread in our families. In our best lands, a good hand will tend 30 acres after the ground is prepared in the spring, and the corn planted. Eight to ten barrels may be considered the average crop, and \$1.50 to \$2 per barrel the average price. The quantity sold, however, bears but a small proportion to that consumed by the farmer in the feeding of stock.

Upon all our large stock farms the corn is cut up in the fall, stacked in shocks of 16 hills square, and fed out to stock in the winter and spring, in lots provided for the purpose, or upon our blue grass pastures.

Our system of feeding and grazing cattle and hogs requires less labor to the quantity of ground occupied than any other mode in which we can use labor. Some of our large farms containing 1000 to 1500 acres, all in grass and cultivation, and feeding 200 to 300 head of cattle, and as many hogs, requiring only about ten good hands to do all the work.

Cattle in all our rich counties form an important item in our system of husbandry—the number fed for the butcher annually being very great; probably in no one item has greater improvements been made than in our cattle. In their neatness of appearance, aptitude to fatten at an early age, and greater weight of carcass, they have been greatly improved.

The breeding and feeding cattle are similar to that of mules. Calves are raised until two and three years old by the small farmers, when they are sold to the grazier, who winters them the first year on fodder, and the next winter and spring they are fed for the butcher.

Our stock now consists principally of the full blood Durham short-horns, with all the intermediate grades, crossed upon our common cattle, with a few Herefords and Long-horns. I can form no idea of the number of improved Durhams of pure blood. The number is now great and increasing rapidly. Very few less than 100 have been brought into the state the present year, mostly imported. The prices given in the last 4 or 5 years have caused a rapid demand for them. Our own

state is not yet fully supplied, and the new states must rely upon us for their supply whenever they are prepared with grass to breed them.

The pedigrees of our imported cattle and their descendants are preserved and published with great care; with but few exceptions, the Franklin Farmer contains the pedigrees of our best stock. We are also preparing to publish a Herd Book, similar to that of England, in which great care has been taken to give correct and faithful pedigrees.

Our principal markets for beef cattle are Louisville, Cincinnati, New Orleans, Baltimore and South Carolina. H. BLANTON.

KIDNEY-SEED COTTON.

To the Editor of the Farmers' Register.

Indian Key, T. F., 15th July, 1839.

The notices in your periodical of new varieties of cotton remind me that I also have a new species, which has been growing at Cape Florida since 1833, and at Indian Key since 1837. I allude to the species called kidney seed cotton in Yucatan, of which I forwarded seeds to many parts of the United States every year since 1827, but I have never received any history of their failure or success. Fearing that even those sent to Cape Florida in the spring of 1833 might have perished by neglect, on my departure from Campeachy in January, 1837, I packed up a small quantity with the other seeds to be carried by myself to Florida; but owing to the delays and difficulties of getting even from New Orleans to Key West, I had finally to pass via Havana to the Florida Reef, and hence did not reach this islet until the 20th of July. In August of that year one mass of the conglomerated seed was planted in a box containing a cubic foot of the soil which here consists solely of calcareous powder colored by vegetable mould. On my arrival here with my family the 25th of December last, I found that the box contained six shrubs about 3 feet high, with stems as thick as my thumb, and branches to correspond. In February last the first bolls began to open, and they continued to ripen during the ensuing months of March and April; and the shrubs were then transplanted on Matacumba. The seeds collected from these bolls I am sowing at intervals in the most unpromising sites and surfaces on that island—e. g. on the dry shell bank which rises a few feet above high water mark of the sea, and on the rocky prairie, behind which is covered with water by every heavy shower. My confidence that this shrub will domesticate itself in the worst sites and surfaces of these calcareous keys is found in the following facts. 1st. It grows spontaneously on similar sites and surfaces near the sea at Campeachy; 2ndly. it has flourished the last six years near Cape Florida; 3rd. a wild species of shrub cotton is indigenous to the rocky wastes of these islands; 4th. the sea island cotton planted by C. Howe at Duck Key 8 years ago continues to grow and bear cotton; 5th. on the 10th May last at Key Vacas, I picked cotton from a shrub which Mr. Punt, an old resident, assured me was planted there in the year 1823—16 years ago. The great importance of this new staple to the Florida Keys may be estimated from the following considera-

tions. 1st. Because they cannot ever be cultivated by large planters in annual staples, and hence they require perennial staples adapted to small cultivators. The reasons are evident; because the surfaces of these islands are so rocky that the plough cannot be used, and because the substance here called soil being nothing but calcareous powder colored by vegetable mould, the latter is decomposed and the former blown away by exposure to the sun and wind; 2ndly. because the kidney-seed cotton yields its staple during the dry season from November or December to April or May; and can hence be picked by even the poor invalids who will certainly visit these islands every winter, when the government of the United States shall remove the obstacles to their intercourse by the establishments of ports of entry; 3rd. because, like all other perennial shrubs, when once planted it is planted forever; and because, like the *morus multicaulis*, when it grows too high for convenient picking, the shrub may be cut down, and fresh stems will spring from its roots. When I arrived at Campeachy in 1827, I found a shrub growing in the yard of Col. Toro which was still bearing cotton on my departure in 1837. In my articles on the *morus multicaulis* in the Key West paper, I have endeavored to show that if the culture of silk be worth pursuing in any of our states, it will be immensely more profitable in the sterile islands of the Florida Reef; and that they alone can supply all the raw silk requisite for home consumption and foreign export. In future articles I shall endeavor to show that the perennial cotton shrub for small cultivators will be still more desirable than the perennial mulberry tree. But I shall leave to time and experience the demonstration of the fact, that for these islands the most profitable of all perennials will be the fibrous-leaved agaves and other plants which yield foliaceous fibres and propagate themselves on the most arid soils.

Very respectfully yours, &c.,

H. FERRINE.

EGG-HATCHING EXHIBITION.

From the New Genesee Farmer.

A short time ago, while in London, I went to see, among other "sights," the much-talked-of egg-hatching-apparatus, or, as it is called by its proprietor, the *Eccaleobion*—a word from the Greek, signifying to bring to life. The establishment is situated in Pall-Mall, opposite the Italian Opera-House, and consist of a large handsome back apartment, entered by a passage from the street. The first feeling on entering the room is that of rather a warm atmosphere, along with the slight smell of a poultry yard, which the place literally is. On one side on your left is a huge oblong case against the wall, elevated three or four feet from the floor, and used as a hatching oven; on the opposite side, running nearly the length of the room, is an enclosure formed of paling, separated in distinct divisions for different sizes of birds, and containing, close to the wall, a row of coops or houses for the little creatures to run into. At the farther end of the room is a glass-case on a table in which the birds of one day old are kept and nursed; and in the centre of the room is a table with a number of saucers in which lie the yolks of eggs at different stages of advancement toward

maturity, but which being broken are of course useless for hatching; they only exhibit the progress of the chick. Such is the general outline of the establishment, which is fitted up with iron steam-pipes running round the room to preserve a certain temperature; and with a man, who attends the oven, and a woman to look after the poultry-yard or enclosure, the whole is before the eye of the visitor.

The first thing we do is to take a peep into the oven, where the process of incubation is performed. This oven executes the office of the parent hen, and in a remarkably perfect manner; in fact much better than most hens could perform the operation.—Every body, who has any thing to do with hatching poultry, knows that the great difficulty consist in keeping the hen upon her eggs. Some hens are better hatchers than others, but, generally speaking, they are too apt to leave their eggs to get cool; and this, by checking the incubation, at once destroys the unborn chick. By the *Eccaleobion* process, this chance of loss is entirely avoided. If the egg be a fresh good egg, it must give up its chick; nothing can keep it from being hatched. The oven or case, as we have said, is a large oblong box projecting from the wall. It is to be divided into eight compartments, like the floors of a house, and each exposed to view by means of a glass door. To satisfy our curiosity the door of one of the compartments was thrown open, and on looking in we perceive that the interior is a sort of shallow box lined with cloth, heated with steam-pipes, and the bottom covered with eggs lying at an easy distance from each other. A jug of water is placed among the eggs, for the purpose of supplying the air of the box with a necessary degree of moisture. Thus each compartment or box is a distinct oven with its own eggs, and in each the eggs are at a particular stage of advancement. In one box they may be but newly put in, and in another they may be in the act of being hatched. The meaning of having eight boxes is to insure a batch of chicks every two or three days. Each box holds from two to three hundred eggs, or the whole upwards of two thousand.

An egg requires from twenty to twenty-three days to hatch according to its quality and other circumstances; the exact time is allowed to be twenty-one days; but such is the variety of eggs, that a batch will require three days in entirely chipping. The progressive series of phenomena during incubation, as exhibited in the broken eggs on the table of the room, are exceedingly interesting, particularly that in which the heart is seen beginning to beat on the surface of the yolk, and are as follows: I quote from a pamphlet handed to visitors:—

"1st. day. In a few hours after exposure to the proper temperature the microscope discovers that a humid matter has formed within the lineaments of the embryo: and at the expiration of twelve or fourteen hours, this matter bears some resemblance to the shape of a little head; a number of new vesicles also suddenly appear rudimentary of different parts of the future body of the chick; those first formed, and most easily distinguishable, may afterwards be recognized as assuming the shape of the vertebral bones of the back.—2d day. The eyes begin to make their appearance about the thirtieth hour, and additional vessels

closely, joined together, indicate the situation of the naval. The brain and spinal marrow, some rudiments of the wings and principal muscles, become observable. The formation of the heart is also evidently proceeding.—3d day. At the commencement of the third day the beating of the heart is perceptible, although no blood is visible; a few hours, however, elapse and two vesicles, containing blood, make their appearance; one forming the left ventricle, the other the great artery. The auricle of the heart is next seen, and in the whole of these, pulsation is evident.—4th day. The wings now assume a more defined shape, and the increased size of the head renders the globules containing the brain, the beak and the front and hind part of the head distinctly visible.—5th day. On the 5th day the liver makes its appearance, and both auricles now plainly seen approach nearer the heart than they were before. That beautiful phenomena, the circulation of the blood, is evident.—6th day. The lungs and stomach are distinguishable, and the full gush of blood from the heart distinctly apparent.—7th day. During this day, the intestines, veins and upper mandible, become visible, and the brain begins to assume a constituent form.—8th day. The beak, for the first time, opens, and the formation of flesh commences upon the breast.—9th day. The deposition of matter forming the ribs, takes place, and the gall-bladder is perceptible.—10th day. The matter forming the skull now becomes cartilaginous, and the protrusion of feathers evident.—12th day. The orbits of sight are now apparent, and the ribs are perfected.—13th day. The spleen gradually approaches in its proper position in the abdomen.—14th day. The lungs become inclosed within the breast.—15th, 16th and 17th days. During these days the infinity of phenomena in this wonderful piece of vital mechanism, elaborate it into a more perfect form and it presents an appearance closely approaching a mature state. The yolk of the egg, however, from which it derives its nourishment, is still outside the body.—18th day. On the 18th day, the outward and audible sign of developed life is apparent, by the faint piping of the chick being for the first time, heard.—19th, 20th, and 21st days. Continually increasing in size and strength the remainder of the yolk gradually becomes inclosed within its body; then with uncommon power for so small and frail a being, it liberates itself from its prison in a peculiar and curious manner, by repeated efforts made with its bill, seconded by muscular exertion with its limbs, and emerges into a new existence.

"The position of the chicken in the shell is such as to occupy the least possible space. The head, which is large and heavy in proportion to the rest of the body is placed in front of the belly with its beak under the right wing; the feet are gathered up like a bird trussed for the spit; yet in this singular manner, and apparent uncomfortable position, it is by no means cramped or confined, but performs all the necessary motions and efforts required for its liberation, with the most perfect ease, and that consummate skill which instinct renders almost infallible. The chicken, at the time it breaks the shell, is heavier than the whole egg was at first."

The superintendent of the oven politely exhibited a compartment in which the eggs were

chipping. Some had chipped the day before, others that day, and some would not be chipped till the morrow; in a few cases we observed the beak of the chick boring its way through the shell and getting itself emancipated. When the little creatures are ushered into the world, they are not immediately removed out of the oven, but are allowed to remain for a few hours until they become dry; they are then removed and put into the glass-case, on the table at the end of the room. This case is very shallow, and the glass cover can be easily pushed aside to permit the superintendent handling them if required. They are here for the first time fed though not for twenty-four hours after being hatched; the materials scattered among them is small bruised grits, or particles little larger than meal; these they eagerly pick up without any teaching, their instinctive desire for food being a sufficient monitor. After the brood has been kept in the glass-case, (which is partially open) for two or three days, and been thus gradually accustomed to the atmosphere, they are removed to one of the divisions in the raised enclosure on the floor. Here hundreds are seen running about, uttering peep crys, picking up grits or otherwise amusing themselves, all being apparently in as lively and thriving a condition as if trotting about in a barn-yard. At six in the evening they are put to bed for the night in a coop; these coops are wooden boxes, lined with a flannel curtain in front, to seclude, and keep the inmates as warm and comfortable as if under the wing of a mother. At six or seven in the morning they are again allowed to come forth into their court-yard, which being strewn with sand and provided with food and water, affords them all the advantage of a run in an open ground.

I made some inquiries respecting the failures in hatching and deaths, and received the following information:—"The eggs are usually purchased from Leadenhall market, and, consequently, not being altogether fresh, or otherwise suitable, one half of them fail in hatching. Once hatched, they are safe, for not more than one dies out of fifty which are brought into existence. If good and suitable eggs could be procured at all seasons the failures in hatching would be comparatively trifling. Bad eggs therefore, are the weak point in the establishment, and I should recommend the proprietor to complete his arrangements, by adding an egg-laying department to those which he has for hatching. This might be done by keeping a regular poultry-yard, either in connexion with the place or in the country. The apparatus for hatching is capable of producing forty thousand chickens in a year, and making allowance for failures, the actual product cannot fall short of half of that number. When three weeks old, as I was informed, the chickens are taken to market, and sold for a shilling each. Thus, we would suppose, the Eccelesibion turns out at least, a thousand pounds worth of chickens annually—no bad revenue, it will be said, after paying expenses, but not greater than the ingenious contriver and proprietor, Mr. William Bucknell, deserves.

This thing, trifling as it may appear to some, is highly deserving of public attention. Attempts to hatch eggs, in ovens are of old date, but have never succeeded on a permanent or large scale in this country. In Egypt the practice has been more successful; yet even there, with the advan-

tages of a superior climate, one in five of the hatched birds dies, and many are deformed, doubtless from the unequal application of the heat. It has only been by the Eccaleobion, as far as I can learn, that the birds have been brought out with certainty, or been reared successfully after being hatched; every bird is perfect and will grow to its full size. The distinguished characteristic of this invention is exact regulation of temperature at different stages of advancement, for eggs, as is well known, develop heat naturally in the course of hatching, and consequently the artificial heat requires to be judiciously diminished as the natural heat increases. By employing steam or hot-water pipes, the temperature is not only capable of being exactly regulated, but is diffused generally and equally throughout the oven, and acts upon all sides of the egg alike. Hence, the eggs in the Eccaleobion require no handling or turning during the process—there is no fear of their being roasted on one side or cooled on the other. Provided all is fair and above board, as the proprietor of the Eccaleobion describes or the superintendents inform the visitors, there can be no difficulty in multiplying egg-hatching and chicken-rearing establishments all over the country. Poultry is at present a dear article, on account of the very limited and imperfect manner of its production; but this need not be the case any longer. There is nothing to prevent every town in the kingdom having its chicken manufactory as well as any other branch of business. Wherever there are establishments with steam-engines having a redundancy of steam, it would be the easiest thing in the world to erect a fowl-producing apparatus in connection with the works. And if this did not in some degree improve the resources of the country, and the condition of the people, I do not know what would.

EXPLANATION.

To the Editor of the Farmer's Register.

In your last No. I find a mountain correspondent of yours has made it my duty to tax you with postage to the tune of 12½ cts. I did not wish to do this, or I should have asked you to correct the caption of my October communication; but I supposed all your readers knew that the caption was yours and not mine, and I ask you and your correspondent to read my piece fairly, and then say if the caption have either matter or spirit in it that is authorized by the communication.* I hold that it was clearly my purpose to show that the early maturation of the crop resulted from its never having its feeding roots disturbed or broken; and I appeal to common sense, untrammelled by usage, without fear, to sustain me. Who is he that breaks the feeders of his horse or his ox with the expectation of "early maturation?" Who has not seen in the burning month of July hundreds of acres of corn killed by breaking all its feeders? I grant that this kind of plants is hard to kill, and if you give it water

* As according to our rules, every article in the Farmers' Register must have a name, and the writers seldom furnish any heading, the duty generally falls upon the editor as it did in the case referred to above. If it was improper, the fault was ours.

the very devil cannot kill it; but let me ask why wage war upon it? why worry and distress the plant that gives you bread? who, I ask "Mountaineer," was ever so mad as to break the young shoots of corn to enable him to break the feeders? and when this was done what was his reward? My soil was what was called poor; I purchased for 21 shillings the acre. The tenant then upon it paid £10 rent, 40 years ago; but at the end of the year he entered "leg bail," and is dead, or in the far west. And yet I believe that all who passed my field, (and it is upon the main southern road,) entertained but the one opinion that there was none better, as a large field, from Washington to Tennessee. I hope I have answered "Mountaineer's" bill in chancery to his satisfaction; if not, he may rule me to give farther answer, and if I have time, I will answer him, with this reservation that he shall lay by his forensic character, and write as a farmer.

For the further benefit of "Mountaineer," let me say that 30 years or more past I visited Judge Peters and Mr. Young. The Judge had done much for agriculture, and I felt myself bound to call upon him and tender him my thanks. He was a perfect gentleman; but as a farmer, practically, he had no pretensions. Mr. Young, I think, owned a large paper manufactory, and was farming upon a small scale—an amiable, clear-headed man, and was delighted in showing the power of lime upon his land; his neighbors however thought he farmed upon the profits of his paper mill. I give you these things that you may use them for what they are worth.

FAIRFAX.

January 7th. 1840.

For the Farmers' Register.

ON MAKING EXPERIMENTS.

Although the successful progress of agriculture essentially depends upon this practice, yet unless it be followed with perfect impartiality, sound judgment, and unremitting attention to every circumstance connected with each case, it often does far more harm than good; for conclusions are frequently drawn and opinions formed from experiments carefully made, which, if not directly the reverse of what they should be, are at least, materially different from the truth. Thus, a negligent experimentalist will rarely ever give us more of his operations than a general description, although he is too often tediously minute in stating his own opinions derived from them, to the entire omission perhaps, of the chief facts, by which alone others could judge whether those opinions were right or wrong. Should he happen to be well known and respected as a farmer, many will immediately attempt to pursue the course which he has vaguely and indistinctly described, solely from their confidence in his character; and will find too late, either that he had omitted some statement which was material to the success of their imitative experiments, or that his opinions and practices, which they had adopted *in toto*, did not suit their particular farms. This immediately weakens their faith in all experiments whatever; for they have not always the good sense to discover the true cause of their failure, but erroneously ascribe it to the inutility of the practice itself, instead of the carelessness of the experimentalists.

A most signal instance once occurred in our own state, of the mischiefs that may be done by agricultural works which appear to recommend as *universally* good, certain things that are only *partially* so, and under particular circumstances. We all remember that excellent little book called 'Arator,' published many years ago, by Col. John Taylor of Caroline, a man who may truly be said not only to have given the first effectual impulse to Virginia agriculture, but to have rendered it more essential service than any *one* man of whom we have any knowledge. In this work was found an unqualified, indiscriminate recommendation of very deep ploughing, high beds for corn, and the inclosing system without grazing. Every body considered him, (and deservedly too,) as *one* of the best, if not the very best farmer in Virginia, particularly for his skill in restoring worn out lands to their original fertility; and such marvels were related of his corn crops by those who saw them, without any accurate knowledge of the various causes which contributed to produce them, that all of us, without exception, especially the tyros amongst us who aspired to agricultural fame, began to tear up our lands as deep as 3 or 4 horses in a plough could turn them; to throw them into the highest ridges which this operation could effect, no matter what might be the nature of the soil; and to inclose their fields without grazing, even to the starvation of the stock. The consequences might have been easily foreseen by all our brethren who had their due share of brains; but unfortunately some of us are woefully deficient in this article. Hence all the owners of very shallow, sandy soils, turned up a perfect *caput mortuum*, an utterly sterile earth, with which they have been carrying on a deadly warfare ever since, or have fled from it in despair, to a new country; whilst each animal of the *bos genus*, on their farms, has served as a kind of "*memento mori*" to every passing stranger. For all this Col. Taylor's 'Arator' bore the blame, although a very moderate degree of discrimination would have enabled them, at once, to decide that, as no one system or practice could possibly suit all soils and situations. Col. Taylor's omitting to particularize the exceptions, proceeded entirely from the circumstance of his giving to his brother agriculturists more credit for common sense than they deserved. By the way, my old and good friend, I wish you or any of your correspondents would tell me, why the term "*common*" should be applied to an article which all agree is one of the most *uncommon* things in the world. I have been in a great quandary about it, for nearly or quite half a century, and should like to be relieved from it before I die. But to return to 'Arator' and its recommendations. That one which I have yet particularly to notice, is "the inclosing system" without grazing. He gave, unfortunately, (as I think,) all the *advantages*, without stating the *disadvantages* of the practice. Hence most of those who tried it, without any specifications whatever of the extent to which it might beneficially be extended, became sceptics, if not entire infidels in regard to its utility. For they found, upon trial, that it not only infested our lands, almost irreclaimably, with many perennial and other most noxious weeds, but made them the prolific hot beds of a variety of insects highly injurious to our crops, which under no other system, probably, could ever suffer so much damage

from the same cause. In the Flemish husbandry, which is said to be the most perfect in Christendom, no labor nor expense is spared to extirpate every thing that bears even the name of weed; but the inclosing practice fosters the whole of them—nay, it greatly multiplies all of them, unless they are mowed down, (which is never done,) before they blossom. This operation, if regularly repeated, only a few times, would soon destroy all annual and biennial weeds, which are much the most numerous; it would also prevent, in a great measure, the increase of the perennials; and by leaving the cover on the land, would still give us the chief benefit ascribed to the inclosing system.

But permit me, before I conclude, to offer a few more remarks on the subject of experiments. To carelessness or prejudice, or to both united, we must ascribe all the numerous disputes and controversies that have occurred, and are still occurring among our brethren, in regard to particular practices in every branch of husbandry. Even men who are equally well disposed to ascertain what is best, must forever differ, unless *all* will bestow the same degree of attention on every circumstance and particular, which are essential to enable them to form a perfectly impartial and correct judgment. If a *single one* of these essential circumstances and particulars are unnoticed by any experimenter, that man will certainly form a very different opinion from the one who has carefully regarded *all* which are connected with the subject of their mutual examination. And the great misfortune to our cause is, that hardly any two men can be found equally qualified, equally desirous to make fair experiments. But for this inequality, together with our presumption and self-conceit, which are generally in a duplicate ratio to our ignorance, many a ponderous agricultural tome would be reduced to the pamphlet-size; and what would be far better, "*book-farming*," which has long been, with many, a term of derision and contempt, would soon overcome all the foolish prejudices which have heretofore existed against it. For our agricultural papers and books would contain little else, besides minute details of experiments in the different branches of husbandry, made with the utmost care and accuracy; instead of being crowded, as they too frequently are, with the crude conceits and visionary opinions of merely speculative agriculturists, who find it much easier work to theorize than to practise; and far less laborious to give us mere opinions, instead of such facts as would prove of real use in promoting our cause.

It may perhaps be concluded from the foregoing remarks, that I am in favor of entirely excluding speculative opinions from our agricultural papers. Far from it; but I would ask as a small favor, in behalf of those who prefer facts, that the authors would merely take the trouble to give these opinions and speculations some caption by which we could judge whether we would read their communications or pass on to others that would give some of the information we want. Let them take, for example, the single word "*excogitations*," which might be written in a few seconds, and we might then use it, as sailors do a light house—steer by it, without ever going into it. For my own part, Mr. Editor, I have no objection to seeing and reading such things occasionally, in an agricultural paper, as I myself, (to confess the truth,) am somewhat addicted to them; and there-

fore, upon that admirable principle of "*doing as we would be done by*," a principle so much praised, so little practised, I would not consent that they should be banished altogether. Only let them be marked, no matter how, but in such a way that they might be distinguished from other articles without reading them, and it will perfectly satisfy your old friend,

COMMENTATOR.

January 1st, 1840.

To the Editor of the Farmers' Register.

EXCOGITATIONS.

You see, Mr. Editor, that I have been the first man among your numerous correspondents, to adopt my own suggestion on the subject of captions; and for so doing, I shall claim of you some portion of that praise which is justly due to those rare people who practise what they preach. I shall also hope that this circumstance, if none other, will secure for me, at least a perusal of what I am about to offer to your readers.

My subject will be that long and apparently interminable vexed question about the best rotation of crops. No one has yet been universally approved; nor has it ever been conclusively settled, whether there may not be at least one, (if not more,) which is far less complicated than any now in vogue, and equally efficacious. In all the rotations and arguments in their favor, which I have examined, far too much credit seems to have been given to the mere alternation of what have been called white and green crops: whereas, I deem it demonstrable, as far as any thing of the kind can be, that the intervention of vegetable and animal manures has been the chief, if not the sole cause of any increased fertility of the soil, which may have appeared where those rotations have been practised. Every experienced agriculturist, I believe, admits that some crops exhaust more than others, but that all exhaust some, if wholly taken from the land. Therefore, the phrase "*ameliorating crops*," is a contradiction in terms, and calculated to deceive; for it is not the crop which produces this effect, but the manure applied with it or to it; although it is certainly true, that a less quantity of manure will suffice to ameliorate the soil, where the crop is one of the least exhausting kinds, than where it happens to be the reverse.

If I am right in ascribing the improvement of cultivated land, chiefly if not solely, to the intervention of vegetable and animal manures between our crops, in sufficient quantities to supply somewhat more than the portion of nutriment which these crops require, then it is a matter of far less consequence than is generally supposed, whether these crops be all white, all green, or an alternation of both. Upon this theory, permit me to propose a course of crops, which, if not new, has not, I believe, been sufficiently tried any where to justify its general adoption. It is to keep but four fields, one for standing pasture, the other three for corn and wheat, which are the staple crops throughout the whole tide-water portion of our state. To these, add a few lots for soiling, and root crops. Let the wheat always be followed by the corn, and give to that, all the vegeto-animal manure of the farm, applied in its freshest state,

as far as practicable. Immediately after the last working of the corn, sow clover seed and plaster of Paris, half a bushel to the acre. Cut this clover in the spring, then sow on it half a bushel more of plaster, and fallow the land in time for wheat, sown upon a single ploughing, and put in by the large drag-harrow. To keep up your lots, depend upon ashes, plaster of Paris, lime, marl, (if attainable,) or any other manures which are free from the seeds of weeds.

To such a course, I cannot foresee even a plausible objection, unless it be the expense. But, if this were greater than that of the other most popular rotations, which it certainly would not be, but much less, then such objection is unsustainable. The whole of the expense in money, would be the first cost of the clover seed; for after that, every farmer should raise his own seed; and then, one bushel of plaster per acre annually, which, at the present price, ready ground, is only 30 cents a bushel in the tide-water portion of Virginia, where you buy it thus; but not more than about 15 cents where you prepare it yourself. Look now at the superior advantages; there would be much more simplicity, and of course greater practicability among slaves, a larger surface always under cultivation, and far less labor, especially in making and keeping up division fences. Add to this the fact that every field would annually produce some profitable crop to the cultivator, which is not the case in any of our rotations in the United States. I say profitable, for although you would not sell the clover which would be produced after the corn, the single cutting would contribute much to the improvement of your stock, while the subsequent ploughing in of the second growth, would return to the land more of the fertilizing principle than the wheat crop had drawn from it. If the land become "*clover sick*," which it would not do in many years, some other green dressing, of which there are many, might be substituted for the clover, until the land again recovered its aptitude to produce this excellent grass.

Should you think this "*flourish*" worth publishing, let it appear as one of the contributions of your old friend and correspondent,

COMMENTATOR.

January 16th, 1840.

ON THE CULTURE OF CELERY.

From the Magazine of Horticulture.

As good celery is always sure to meet with a ready sale in the market; and commands a liberal price when found there, I propose giving a few practical remarks on the necessary treatment required, from the first sowing of the seed in the spring, to the taking up of the roots, in the autumn, for use. In the first place, be it remembered, that the writer of this does not claim any greater knowledge than that possessed by gardeners and others, who have had experience in the cultivation of celery; but as this article may meet the eye of those persons who have not acquired the requisite knowledge, to grow it to perfection, it is probable that they may glean something from it, that may be of some assistance to them.

There are six or eight varieties of celery cultivated, and all those who cultivate it, have their

favorite kinds ; nevertheless, I will venture to recommend the white solid, and the rose colored solid celery, to be grown, either for the market or for private family use. The second week in April, if there is a cucumber frame at work, prepare two or three shallow boxes, and fill them with fine rich soil, and sow the seed on the surface, with a liberal hand ; then press it down pretty solid, with a piece of board and cover it, lightly, with very fine sifted earth ; this done, give the whole a gentle watering, and place the boxes in a frame, close to the front.

When the plants make their appearance, give them air every day, if possible, by propping up the sash, at the front, where the boxes are placed. As soon as it is perceived that the plants have the least tendency to grow up weak, they must be removed from the frame, immediately to the open air, choosing some well sheltered spot. On the approach of foul weather they may be removed to some place under cover, and taken out again after the unfavorable weather is over. If no frame, as spoken of, be at hand, sow the seed on a rich moist piece of ground, the last week in April, in a sheltered situation ; the ground must be well enriched for this purpose, and the older the manure is, the better. Dig it over, and rake the surface very fine and even ; then sow the seed pretty thick, on the surface, and with a clean spade beat it lightly down, nice and even, and cover it over, about a quarter of an inch, with fine soil.

As soon as the plants are about two inches high, they should be transplanted into a nursery bed—but, previous to this, the ground must be well manured and dug over ; then lay a board on the ground, in order to stand upon, and set the plants out in regular order, at least three inches apart, plant from plant. Some may think this last process too much trouble ; but I can assure all who have such an idea that it is a process indispensably necessary, and the utility of it will be presently seen. When the plants are taken up from the seed bed, before proceeding to transplant them, do not neglect to rub off all the side shoots, which, it will be seen, are just making their appearance around the base of the plants, and cut off the ends of the roots, if it is desired to produce first rate celery.

About the first or second week of July the plants will be ready for the final planting out—their strong, robust appearance, by this time, I imagine, will give great encouragement to the grower, to go on and end the good work ; but on the contrary, if the plants had not been removed from the seed bed, as before advised, what a miserable appearance would they now make ; so much so, that the stems being too weak to bear up the tops, now that they stand singly, they would lie flat upon the ground. When this is the case, the remedy is, to cut off the tops, and leave three or four naked stems sticking up—a disgrace to any person who has the least pretensions to its cultivation. The plants being so weak, it will be found necessary to shade them from the sun through the middle of the day, for some time, until nature has made a fresh effort, and the plants start to grow ; not so with those that have been transplanted ; for by removing them with a trowel, on a damp day, they will scarcely feel the change. This is the gain—for whilst the others will require shading and nursing, these will be making a rapid growth ;

and however well the former plants are nursed, it is rare that they ever make such good heads as those that receive no check.

If the cultivator has a peat meadow, that is at no time overflowed with water, he will find it the best situation of any, for the growth of celery ; but as there are but few, comparatively speaking, who have such facilities, the next best location would be where the soil is deep and moist, with the sub-soil clay. One sure guide to go by is, always to prefer deep moist soil, whatever the sub-soil may be ; for it matters not, however rich the ground is made with manure, if there is a deficiency of moisture, the growth will be stunted.

In preparing the trenches for the final planting, if the soil is deep, dig it out to the depth of eighteen inches by fifteen inches in width ; and the length as far as is thought proper for the number of plants ; six inches of the trench must be filled up with the best old rotted manure that can be procured ; as long strawy litter is not suitable, it should never be used. After the manure has been thrown into the trench, it should be dug over, in order to mix the soil at the bottom of the trench, thoroughly with it ; this done, cut a little of the soil from each side of the trench, for the purpose of covering it about an inch, and it will then be ready for the plants, which should be set out six or eight inches apart, in a straight line, down the centre.

Keep the celery free from weeds, and earth a little, at different times, until the trench is nearly filled up ; then earth it up no more, until it is done for the last time, which should be the first or second week of September, or sooner, if necessary. I have two reasons for following this process. The first is, that the roots of the plants are already covered as much as they ought to be, if we suppose the sun and air has any effect on them, or is of any benefit to them. My second reason is, that the celery will make a stronger growth, and will be very much superior, both in size and quality, to that which is earthed up every week or ten days, as is generally done. Good celery ought to be solid, thoroughly blanched and of large size, and perfectly clear of any blemish, such as rust or canker.

J. W. RUSSELL.

Mt. Auburn, Cambridge, December, 1839.

ADDRESS, DELIVERED BEFORE THE MASON, CABELL AND KANAWHA AGRICULTURAL SOCIETY. By Gen. P. H. Steenbergen.

Gentlemen of the Agricultural Society :

As your presiding officer, I am required to lay before you such communications as I believe conducive to your interests and prosperity.

I could have wished that some other gentleman had been selected to address you on this occasion—one who is better qualified than I am ; but as your friendship or partiality has assigned me this duty, I will proceed to the task, requiring at the same time all the indulgent feelings you possess towards an agriculturist, who feels himself more competent to manage well his own estate, than to advise others how they should conduct theirs.

In the execution of this duty, I must necessarily take a review of the character of our soil, the present state of farming in this valley, and in the neighboring country ; and in its progress, contrast

them with other sections of the state, that we know are marching onward, with rapid strides, to high fertility.

The alluvial bottoms of the Ohio and Kanawha were naturally as fertile and productive as any in Virginia; they are admirably intersected by fine, bold, navigable streams; possessing a mild climate, well adapted to the growth of all the vegetable productions. What prevents the owners from reaping the reward to which the occupancy of such soil, and the enjoyment of such a climate, would justly entitle them? Nothing, I believe, but the want of judicious management. Our land is yet good; and although it has suffered severely by repeated grain crops, it possesses within itself the power of resuscitation.

How then shall we stimulate them into active production? What resources are at our command, that when applied will certainly restore their original fertility? We have no lime, plaster, or marl; these cannot now be procured, but at such prices as will be ruinous to use them. We must seek this improvement then by deep ploughing, the alternating courses of grass, and the preservation and use of farm-yard manure. These, assuredly, are within the control of every man owning an acre of land.

You should commence immediately, if you have not already begun, the sowing of clover and timothy combined; let none of your ground remain another season idle, without some grass growing upon it. Our soil, by the use of clover, may be brought to the highest state of fertility, particularly when combined with moderate grazing of cattle, and the eradication, in a green state, of all weeds and filth that grow up.

With due respect for the practice of others, I must say, that I am no advocate for the non-grazing system pursued in some parts of the state. They sow clover, and permit it, as well as every spontaneous production of the earth, to mature all their seeds. I think it is of more advantage to be grazed, and kept in a green, succulent state, making continued efforts to bloom, than suffered to remain, dry up, and have its best virtue scattered by the sun and winds; besides the cattle leave on the soil, better prepared, the very elements of fertility.

It is indispensably necessary, therefore, that a proper quantity of cattle should be kept on every estate for its due improvement. They are emphatically destroyers of weeds, briars and shrubs; the restorers of soil; the chemical agents constantly preparing new food for future plants; they return to the earth, when judiciously managed, more than they exact from it.

Look for example at the grazing districts of Virginia and Pennsylvania. What else has kept them progressing with such rapid strides of improvement? Every year produces a sensible addition to the productiveness of the soil, and to the profits of the farm. Their pastures are thickened and carpeted over with green sward.

My practice has always been, to feed all the roughness growing on my farm, on my grass land. Straw I consider an excellent application for meadows or for pastures; the grass growing through prevents the exhalation, while the continued dampness and heat combined, soon causes its decay; but in the corn-stalk we have our greatest source of manure, growing usually, as it does in this coun-

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try, to the height of twelve or fifteen feet. Open, porous, imbibing and retaining the moisture that rapidly acts as the element of its decomposition, it soon becomes the active, stimulating food of future vegetation. How important is it then, that every farmer should fully understand how he can use them to the greatest advantage?

Corn may be called the staple of the country; it is justly considered an indispensable article of food, and the principal source of profit to the cultivator. It is the leading crop of the alluvial lands of our rivers. Standing therefore, as it does, in the front rank of our necessary and productive husbandry, it well becomes us to look to every source by which we can maintain the fertility of our soil under the severe exaction required for its production.

All the corn raised on an estate, when ripe, and before the fodder has dried, should be cut up and securely shocked; it is immaterial to what use it is afterwards applied—whether for feeding or for sale—you will have the fodder and stalks in either case at your command. Feed them on your grass land, in the fall and early part of the winter, where the animal matter of the cattle, combined with your stalks, all turned under after the frost leaves the earth, will, with the decay of the sod, furnish a cheap and good preparation for a corn crop. You carry out, by an easy application, the principle now well established, that long unrotted manures are most suitable, and best fitted for fall maturing grain.

You here apply at once, and on the spot, where under other circumstances you would have to expend much time and labor in hauling your fodder from the fields to the barn yard, and in again carting your manure back to the field.

Such is the practice I have pursued for several years past, with entire success. It has enabled me to take two successive crops of corn, and on one occasion averaging the first year near one hundred bushels to the acre, on a field of fifty acres, which before this treatment would not have produced half that quantity.

I consider this difference as produced entirely by the alternating with grass, and the feeding of all I raise upon them, ploughing under a part as before intimated, and the balance remaining to decay on well set pasture fields.

I have lately examined some estates in Cabell; I know well all those in Mason, and most of those in Kanawha, and I do really believe, that generally the radical error committed in their management is the want of a due proportion of grass. Too much grain is raised without an ameliorating green crop, and proper economy in husbanding their resources for manure.

I have seen many fields from which small grain had been taken, left without grass seed being sown upon them, the corn-stalks thrown into the public highway—a nuisance to the traveller; the cattle poor starved looking creatures. Nothing can excuse such negligence.

In the Valley of Virginia, and frequently in the north, clover seed is sown on small grain when the land is intended to be ploughed next year, under the persuasion that the seed is well paid for in the fall pastures, and such improvement as the land receives. With what propriety then should a farmer refuse to sow clover seed when he intends his fields to lay over for one or two years before they are again brought into cultivation?

Many gentlemen have told me, that they have not land enough in possession to leave a part in grass, they want it all for grain.

Such was the opinion and practice which heretofore ruined much of the lands of our state.

I believe that no matter what sized farm a man may own, to manage it judiciously, a certain part must always be in grass. To say how much, will depend upon your situation; a contiguity to towns and villages enables you to buy manures and other stimulating substances, which, with the addition to those made on the farm, will enable you to cultivate a greater proportion. But in looking alone to the resources you can control, and requiring the greatest amount of grain to be obtained without serious injury and ultimate sterility, I should believe, that one-third of your tillable land ought to be in grass, one-third in corn and wheat successively, feeding all your roughness as before indicated on the grass previous to ploughing for corn. You will have made at the same time a good preparation for wheat.

The long manure turned under with the clover lay, is decomposed during the summer months, and is then in admirable condition for the subsequent growth of wheat and clover.

This system when pursued, upon our naturally fertile soil, will certainly improve it, for under every rotation something will be gained.

I have adopted a different course. From the quantity of land I cultivate, I am enabled to let my fields remain three years in grass, and in that length of time they are generally well set in green-sward. It is said, that while a good clover lay will yield five tons of vegetable matter to an acre, a well set sod of green-sward will produce twelve tons.

I am satisfied that there is as much difference in the fattening qualities, as there is in the fertilizing properties. It is a fact well known to every grazier that it is impracticable to make really fat cattle on pastures alone, without a great proportion of green-sward grass, and you can only obtain it by time and extended cultivation.

I have spoken of the alternate crops of corn, wheat and grass, and the preparations they require; and will turn your attention to the value of small grain crops as a part of a well conducted rotation.

Wheat has not until recently become a leading crop among us, and although much of our hilly and rolling lands are well adapted to its culture, as yet the woodman's axe has reduced but small portions of our forests to a state fitted for its cultivation; where industry however, has overcome the toils of clearing, and wheat has taken the place in our husbandry which its importance deserves, the most valuable results have followed.

The crop of small grain operates as an important aid in introducing a grass crop, which it shelters from the sun in its tender state—the grain gives a return in proportion to its cost and culture, equalled by few of our other crops, and the straw is found to be important winter forage, and a valuable fertilizer of the lands as I before remarked.

As a proof that this branch of husbandry is about taking its place in an improved course of agriculture, I may refer to a distinguished member of our society in this county, who harvested during the present year about five thousand bushels, and to no inconsiderable number in each of the

three counties whose crops have ranged between one and two thousand bushels.

Our climate and soil, although not as favorable to wheat as the more elevated districts of limestone land, yet gives us a full plump grain, weighing frequently from sixty to sixty-four to the bushel, and yielding under ordinary care from twenty to thirty bushels to the acre.

The spring wheat from Oneida in New York, has been tried by some of our public-spirited farmers, and although the results have not equalled the success of its more northern culture, yet I have the assurance of some who have cultivated it of its usefulness, and that its produce during the present year on the farm of Mr. Matthews, was twenty-seven and three-fourth bushels to the acre. The spring as well as the winter wheat from abroad may require time to acclimate it, and experimental crops must be continued for some years, before conclusive opinions can be safely formed of their value. Before dismissing the wheat culture I beg leave to remark that brining and liming the grain before sowing has been found of decided advantage. By the first operation, the light and imperfect grains are separated, and the more perfect and vigorous only committed to the earth. And by the second, the small portion of calcareous matter which enveloped the seed is proved to give valuable aid in the germination of the grain and growth of the plant.

The occasion does not permit my passing without notice the importance of wood pastures. I trust that the facts and experience which I have detailed will have sufficiently illustrated the indispensable necessity of a competent supply of the grasses. How this supply may be best obtained and enlarged as the herbage of the forest annually diminishes, is a subject of deep interest to every farmer.

In other states, and in other quarters of our state, this supply has been obtained by fencing in districts of wood-land, clearing off the dead timber and undergrowth, and seeding the land with artificial grasses. This process is not an expensive one; in a short time it gives us luxuriant pastures; converts the rough hills which are of but little value for other purposes, into most useful parts of the farm. The timber and wood left on the land, furnish the necessary supply for future wants, gives a park-like appearance to what was before a dreary and almost useless appendage.

I have had a considerable portion of my hill land fenced and prepared for seeding by contract, at three dollars per acre, but the cost must necessarily depend on the amount of down timber and undergrowth to be destroyed.

In bringing land into woods pasture I have found it best to seed with a variety of grasses, clover, timothy, orchard grass and green-sward, with red top on the wet or swampy parts, forms the earliest and best grazing, and soonest gives a good sod. Care should be taken in grazing it but lightly the first year when the roots are small and tender and the grass easily pulled up. When the roots have penetrated to some depth, stock may be freely put on. Their fondness for every species of green food will prompt them to keep down and destroy the sprouts and branches—their trampling will consolidate the surface and hasten the formation of a general sod; while their droppings will both fertilize the land, and distribute the grass seed taken in with their food.

An hundred acres of such pasture supplied with water will fatten from fifty to sixty steers from early in the spring until the harvest fields and young clover sown with the grain are ready for their use; and will be found in fine condition for fall and winter grazing after the other pastures are exhausted. So decidedly does my own experience prove the value of woods pasture, that I cannot forbear earnestly recommending to every person who has hill land near their low grounds, to lose no time and spare no effort in reducing such land to well enclosed and well seeded pastures.

I may justly congratulate you, gentlemen, on the spirited efforts made, and making, to introduce among us the best breeds of domestic animals. The contribution from Cabell of one of the finest bulls imported from England, by the Scioto Importing Company, with beautiful specimens of his progeny, do great credit to their owner. From Mason, also, we have some fine specimens of Durham stock, pure, as well as mixed with the Devonshire, and common stock of the country; while Kanawha contributes her share of public spirit in the cattle brought together by her citizens, composed of fine Durham with various mixtures, speaking well for the enterprise and judicious management of their owners. The Berkshire hogs are also among us, procured from Albany, and various crosses with the best Irish and American stock, from other quarters.

The Saxony, South Down and Berkshire sheep, are also sprinkled through this and the adjoining counties, all evincing the laudable efforts of our farming community to keep pace with the improvements of the age.

I must however remind you that Durham cattle and Berkshire hogs require Durham and Berkshire pastures; their early maturity, and enlarged size, are the rewards of good grazing, and suitable care; neither are adapted to the scant herbage of the forest or the acorns of the woods.

The root crops, so highly valued in Europe and in the northern part of our own country, have been the subject of useful experiments among us; so far as tried they bid fair to become an important auxiliary in winter feeding; the specimens and reports on this branch of our husbandry will best illustrate the advantages of enlarging their culture, and will I hope secure further and more extensive experiments.

Observing that we are honored with the presence of many ladies, I trust to their indulgence in remarking, that the wives and daughters of an agricultural community have it much in their power to aid in the pleasures and profits of a well conducted farm; the various, valuable and beautiful fruits which we have seen to-day, from the looms, the dairies and the gardens, fully attest the importance of female co-operation, and the value of female efforts in domestic productions; and gives the cheering assurance that at our future exhibitions the ladies' department will obtain pre-eminent interest.

I fear that I have trespassed on your patience; but in a field so broad, and with such a variety of interesting topics pressing upon the mind, I have found it difficult to restrain myself within narrower limits.

As a first effort in this quarter of the state to address brother husbandmen on leading subjects of great interest to us all, I must bespeak your libe-

ral indulgence, which I do with the confident hope that our future meetings will bring out more interesting and valuable addresses from those that will follow me.

SOURCES OF ERROR IN EXPERIMENTS OF THE PRODUCT OF DIFFERENT KINDS OF CORN.

There have been published so many and such contradictory accounts of the products of twin-corn, and of other varieties, that general readers are unable to arrive at any conclusion; and of those who rely on some one experiment or report, some are convinced that some particular kind of corn is the most productive by a third or more, and others as well convinced that it is as much inferior to the ordinary kinds. Yet, if rejecting all loose opinions, and imperfect testimony and uncertain facts, we have the results of actual experiment and measurements, made by gentlemen of undoubted veracity, and competency for observation, which sustain both the extremes of the opposite opinions. Whence arises such striking contradiction?

The cause of these and all such contradictory reports of comparative products, is this: it is a fact well known to every practical cultivator, that the product of corn, more especially, is greatly affected by differences of season at particular junctures, and this difference is made the greater by differences of times or manner of tillage, in connexion with the seasons. Thus, if of two distant lots of corn, in all respects equal, and alike cultivated, one receive a sufficient rain soon after its last ploughing, and just before the shooting time, and the other lot remain without rain but two weeks longer, the result would probably be that the first would produce 25 per cent. more than the second. Now suppose two parts of the same field of corn, in all respects equal and alike, except that of being planted in different varieties of corn, and one, two weeks more forward in ripening than the other. Suppose further, the seasons to visit both parts alike, and the tillage to be the same in time as well as in kind. Still, is it not manifest that if a particular tillage, or a rain, occurs at the best time for the one variety of corn, that it will not be so for the other? If either suits the one kind precisely, it must be two weeks too soon, or as much too late, for the other. And this difference alone would be enough to cause a very considerable difference of product in that crop, although the two kinds of corn might be both good, and equal in productiveness, on a general average of years and of seasons.

But besides the above-mentioned and very common sources of erroneous judgment, there are others, affecting every comparative trial of differ-

ent kinds of corn. If planted at like distances, if the one kind has proper space for that particular situation and season, a very different variety of corn would probably have too much or too little. And if different distances are allowed, the proper and correct allowance can seldom be made in new trials.

Though more distrustful than most others seem to be of the alleged superior productiveness of new and highly praised kinds of seeds, still we would by no means desire to discourage comparative trials. All that we have aimed at, in these and previous remarks, is to prevent too much reliance being placed on single experiments, or insufficient testimony of any kind.

Besides the reports of several gentlemen which were communicated for, and published in this journal, we have heard several other concurrent opinions, (and indeed seen the growth in one case,) going to confirm the superior productiveness of the twin, or Baden corn. But one of those who had the largest and fullest experience of all whom we have met with personally, and who had a high opinion of this corn, still recommended to others his own practice of planting but a part of his crop in that kind, and for this reason: that, in a favorable season, it was more productive than other kinds, but less so if otherwise; and therefore he deemed it useful not to trust to it for his entire crop. Now we do not assert the soundness of this objection—and the remedy proposed is but a mode of dividing and balancing risks of loss. But the same objection, and the same reasons for difference of productiveness, must apply, in a greater or less degree, to every two varieties of corn, having considerable difference of character.—ED. F. R.

ON THE INJURIOUS EFFECTS OF KYAN'S ANTI-DRY-ROT SOLUTION, AS REGARDS THE DESTRUCTION OF VEGETABLE LIFE.

From the Gardener's Magazine.

Some of the rafters in one of the pine and grape houses in Thoresby Park, having become quite decayed by dry rot, Earl Manuers was recommended to use timber for the new rafters which had been steeped in one of Kyan's patent tanks. Accordingly, ten new rafters for the roof lights to work upon were put up in February, 1837; such rafters being first steeped in the solution, at the strength of one pound of corrosive sublimate to ten gallons of water. These rafters were in use one year before being painted, and in that time totally killed three fine vines trained to the first three rafters, and seriously injured those trained to the remaining seven rafters; so much so, indeed, as to quite kill the fruit upon them; and, in fact such was the injurious effect of the poisonous vapor drawn from the wood, that the fruit in the remain-

der of the house was of a very inferior description. The pine plants standing immediately under these rafters were seriously injured, and a considerable number of them were quite destroyed; the remainder, on being placed in the fruiting pit, in a very short time put up a small weak premature fruit.

The cause of this great damage to both the vines and pine plants, was the damp vapor which arose from the heat of the house; and also from rain soakage occasionally falling upon them.

In the spring of 1838, these rafters were carefully painted four times over; but, although the injurious effects were thereby in some degree diminished, yet the plants looked unhealthy, and did not fruit properly.

At the present time, the young vines are looking yellow, and have not a single bunch of grapes upon them; and the pines under these ten rafters are weak and unhealthy, when compared with those at the other end of the house.

In 1837, twelve young vines in pots were watered with water taken from a tank in part supplied from the roof of this hot house, and these plants were all killed in a very short time.

A trellis-work flower stand, made of deal timber that had been steeped in the solution, was placed in a small green-house in the gardens, and if this had not been taken out, every plant in the house would have been killed by the noxious vapour arising from the wood. The plants soon came round again after the removal of the trellis.*

PROMISCUOUS REMARKS.

For the Farmers' Register.

Uniformity.—A field containing rich and poor, wet and dry, high and low, black and white, or sand and clay grounds, reminds me of the confusion at the building of the tower of Babel; when one portion is ready for operations the other is disorganized; consequently the unskillful, or lazy artizan, must either quit the premises or starve. If the farmer will not be at the expense of draining his wet grounds, or wetting his dry grounds—if he will not mix his sand and clay—if he will not modify his black and white grounds—if he will not manure his poor grounds—then he should cultivate separately each different portion, however small, in different crops, suited to their nature; whereby they are made separate and distinct fields. It is not only important that a field should be uniform in quality, but that it should also have a uniform surface, for which purpose the farmer should at every ploughing and harrowing have an eye to this object. Even our bottoms have their sinks and bumps, and without attention they will so remain; but with attention they will soon disappear. Before the fallow plough starts, let the farmer examine the field, for the purpose of ascertaining the direction of every sink, however

* Of the conservative efficacy of the Kyan solution upon the woody fibre which has imbibed it, several articles in our pages afford satisfactory evidence;—of the remarkably deleterious nature of the effluvium from the surface of timber, thus treated, upon vegetable life, the above paper furnishes an instance singularly striking and demonstrative. G.

inconsiderable, and when started, let him walk in those sinks, the team following directly behind; thus laying out the field into lands of different sizes and shapes, as the deflections may require. A few such ploughings will cut down a slight bank, consequently a slight sink is filled, and additional work will presently level more uneven ground. It will be understood that when speaking of the level, I do not mean a perfect horizon, but a uniform grade; yet for grounds sufficiently porous to absorb rains as they fall, I would prefer a perfect level. Nor would I be understood as recommending a naked fallow to ridging on clay; but will the reader not discover the folly of ridging clay, which has an uneven face? will the water not gather and stand in the sinks, to the destruction of the neighboring vegetables?

The harrow also assists much in levelling, whether worked in the direction of the ploughing or crosswise.

In ditching likewise the farmer should have an eye to the filling of sinks. The earth cast out of a ditch should be removed and spread on some adjacent sink, unless indeed there is a probability that by some means the ditch may presently become useless, and consequently a pest; in which event the earth should be returned.

The farmer should if possible avoid turn-rows, for they breed briars, weeds, and pestiferous grasses; consequently he should avoid open drains; for every such drain within a field must have two turn-rows. Besides the pests, let the farmer count his loss of ground, and times in turning, and he will either wink, or nod, if he does not speak.

Under-drains are made of wood, or stone, or brick, or tile. I have used wood, stone, and brick; as to brick they are too costly; where stones are convenient I would use them for a short drain, the lower end of which has an outlet; but in the general, logs laid in the manner recommended by Col. Taylor is preferable; only I would recommend the use of larger logs. Stone and brick, (and perhaps tile,) are objectionable in this; that after hard or long continued rains, the water runs in such quantities, and with such velocity, that these materials are undermined, and sink, consequently the drain is choked; moreover I have known clawfish to make dams, and cast out the water. A long and large log cannot well sink, and if it should, there is yet a drain; nor can a clawfish well contrive to make a dam amongst logs. Where timber is an object, under-draining, according to the recommendation of a late writer in the 'Cultivator,' must be preferred. His mode is to turn down guttered logs, placing short boards underneath, and crosswise, for the purpose of preventing their sinking.

I have a bottom field, a portion of which is clay, the balance sandy; on the clay, and not far distant from the sand, there is an ooze, which a few years ago I determined to dispose of; for which purpose I cut a ditch from the ooze into the sand, cast in stone, and returned the earth; but presently, by the operation of clawfish, the water again appeared. I then cut another ditch, near the original, and filled with logs, but to my mortification the water appeared again. If this drain had an outlet at the lower end, I have no doubt but that the last experiment would have been effectual; but the clawfish and lizards stirring up the mud, the

pores were stopped, and out came the water. Shall I acknowledge that a clawfish or lizard, is a better mechanic or philosopher than I? No—no—I will cut a wide and deep ditch, and fill it with coarse sand, which will absorb, and convey off the water, and in which the clawfish cannot enter; taking care to cut deep at the spring, thus securing a fair start. Indeed if this experiment should fail, what of it? I do not consider that I have lost by the former experiments, neither can I lose by this, although failing; for first I got clear of the stone, second my ground was manured by the buried logs, and the sand will be the means of improving the clay.

Facts and inquiry.—We all know that Hessian fly will deposite their eggs in wheat; I know that they likewise deposite in rye and oats, and believe that they deposite likewise in grass. Now if it may be possible that the fly would prefer depositing in oats to any other vegetable, then nothing can be more certain than the protection of our wheat and rye by sowing oats at the same time with these. The grazing of the oats would more than compensate for the seed, and both oats and fly would be swept off by the winter's frosts. It is my opinion that wheat is first choice, oats next, and rye last; but if oats may be first choice, then by their use, hundreds and thousands could be added to individual purses, and millions to the country. Can any one give us any facts relating to this subject?

Frozen pumps.—My water pumps freeze in winter, so that I am subject to considerable inconvenience; can the editor, or other person, inform me how it can be obviated?*

Winter ploughing.—Solomon says, "He that will not plough by reason of the cold, shall beg in harvest and get nothing." So we see that so far back as the time of Solomon, ploughing in winter was necessary, and all-important; and no less is the necessity and importance at the present time. I say therefore to my fellows, plough on at every opportunity through the winter. Plough your clays first, then your loam, and lastly your sand. Feed your horses well, and they need no more rest than a man, that is one day in the week. I beseech you again, drive on, or you may beg in harvest and get nothing; or what is nearly as bad, you may reap a harvest and get nothing.

Winter preservation of oats.—If you wish to have oats for early cutting or grazing, sow about the first of October, and in the latter part of November cover them lightly with straw. In this way they can be preserved as well as turnips.

MOUNTAINEER.

December, 1839.

THE GALACTOMETER, OR INSTRUMENT FOR MEASURING THE RICHNESS OF MILK, AND DETECTING ADULTERATIONS.

To the Editor of the Farmers' Register.

Clermont, Fairfax co., Va., Jan. 5th, 1840.

DEAR SIR—I put in charge of my son, James M. Mason, who was with me a few days ago on his way to Richmond, a little instrument, recently procured for me by a friend at Paris, intended to ascertain the relative purity of milk, of which I

* We have no practical knowledge on this point.—ED.

beg your acceptance. To induce you to do so the more readily, I will state, that as I have retained one of the same description, it will be no deprivation to me, and that I am gratified to have an opportunity of placing it in hands, better than my own to test its utility.

I have long thought it a desideratum of importance to farmers, to be able, by some easy means, to estimate the relative value of milch cows, the effects of different kinds of food on the product of the cow, and the comparative fitness of pastures, as to the same. Whether this Galactomètre of M. Cadet-de-Vaux, will answer the purpose, remains to be tried. From the printed description which I send you, it would seem, that it was chiefly designed to detect the adulterations practised in milk brought to market. But on the same principle, I should suppose it would indicate with accuracy enough for common purposes, its relative richness, if graduated to that end; indeed, as you will remark, it is, in the description in general terms so said; "*plus le numero 1^{er} est découvert en s'approchant de 0, plus le lait est crémeux*;"* but as no scale is marked below No. 1, we are left in uncertainty, as to fixing the quantum of creamy, or butyraceous matter. As it has been but lately received, I have not yet been able to test it otherwise than as to adulteration of milk by water; in this, I found it quite accurate, as to the portions of water introduced. I tried it on the milk, as just drawn from several of my cows, and found the rod immersed nearly to the same point, in each case at and about 0. This result was expected, as the cows were of the same family, and good, being all Devons, and fed in the same way at this season, on beets and cut hay.

I have remarked, that in the investigations made some years ago by M. Barruel of Paris, in relation to the adulteration of milk, (republished in the 1st number of your Vol. 2,) it is said "that all instruments for ascertaining the purity of milk, which are calculated to attain this end by pointing out differences in its density, or specific gravity, are inaccurate and useless," and that he attributes this difficulty, in part, to the fact (as held too by others,) of the suspension in pure milk of caseous, as well as of butyraceous matter, and to the difference of density in the milk, as the one or the other of these may happen to preponderate, but mainly to the case of its adulteration by foreign matter, other than water, devices toward which are quoted, as practised in Paris, some of which so ingenious and even scientific, as to baffle detection by any but chemists. Yet, so far as I have looked into the subject, I can but be of the opinion, that the plan adopted by the ingenious Mrs. Lovi of Edinburgh, in the use of the areometric beads, invented by her as long ago as 1816, and commended by the Highland Society, by which the specific gravity of milk is tried, first when just drawn from the cow, and next, when after standing the proper time, it is skimmed of its cream, when it will be found that the skimmed milk is of greater specific gravity, and this increase being produced by the separation of the lighter body, the cream, the quantum of that increase, or the difference between the specific gravity of the new,

* "The more that the mark of No. 1 is left uncovered and approaching to 0, the more creamy is the milk."—ED.

and the skimmed milk, will bear proportion to, and may be taken as a measure of, the relative quantities of the oily matter or butter, contained in different milks, and without, as I suppose, any sensible deviation caused by the caseous or cheesy matter that may exist in them; to ascertain the quantum of which oily or butter-matter is to us in this quarter of the country, where cheese is rarely made, the great object; and if this can be attained by the process just described with the beads. I see no reason why the Galactometre now under consideration properly graduated, may not, by means of the same process, be successfully used, and it may perhaps, because of its simplicity; be better adapted to general use.

I submit these remarks, crude as they are, my dear sir, to your revision, if you think them worth the trouble, and the Galactometre to your examination, and better judgment, as to its application, should you deem it likely to be useful to our agricultural interests.

Your obedient servant,
J. MASON.

The neat little instrument which we received with the foregoing letter, was accompanied by the advertisement of the inventor, or salesman, in French, from which we extract and translate the following description.

"A thin tube of glass, constructed upon the principle of all other instruments for showing the specific gravity of fluids, (*pese-liqueurs*,) offers a graduation from 0 to 4 degrees.

No. 1 indicates pure milk;

2 " the addition of one-fourth of water;

3 " that of a third of water;

4 " that of a half of water; and

the more the mark is covered, the still greater the excess of water. In like manner, the more that No. 1 is uncovered [or rises above the surface of the milk,] and No. 0 approaches to the surface, the more creamy or rich is the milk.

"This very simple and distinctly marked graduation clearly shows the differences of value.

"It is obvious that, by the immersion of this tube in the vessel containing milk, it will be known, without calculation, if the milk is, or is not, adulterated to the extent of a quarter, third, or half, of water. The instrument receives its name from this convenient property; *gala*, milk, and *metron*, measure, or milk-measure.

"Price—tube of silver - - 22 francs.

" of glass - - 3 francs.

Those who may desire to purchase at Paris, should order the "*Galactomètre selon Cadet-de-Vaux, construit par L'Ingénieur Chevallier, Opticien du Roi, &c. &c. Tour de l'Horloge du Palais, No. 1, vis à vis le Marché aux Fleurs*."

We think that this cheap little instrument would not only be very useful for making such experiments upon the natural milk of different cows and

upon different kinds of food, as Gen. Mason speaks of, but for another important purpose. Milk buyers in large towns, by this means, could so easily detect and estimate the amount of water which they buy with their milk, that their being so informed would necessarily produce an entire change in that branch of trade and manufacture, as it is said now to exist.—Ed. F. R.

PREMATURE FLOWERING OF FRUIT TREES AND SHRUBS.

From the Magazine of Horticulture.

The season, as observed in this quarter, exhibits some singular phenomena in the vegetable kingdom. The severe storm of the 30th and 31st August seemed to operate upon most of the plants in our vicinity, like a frost, or a fire—curling, blackening, withering, and killing the foliage, which generally soon dropped off, leaving the limbs and trunks in a great measure denuded. This January nakedness was succeeded by a new dress of leaves; and at this moment many of the fruit trees, as plums, &c., the smaller ornamental trees and garden shrubs, particularly the laburnum and others of the acacia family, are actually blossoming a second time. These re-duplications are believed to be injurious to the future growth of plants.—*Nantucket Inquirer*.

[The same phenomena have occurred in many other places. In Sandwich, Mass., and in other towns on Cape Cod, the apple and pear trees have flowered. A friend of ours, in Sandwich, informs us that his apple trees have been almost covered with bloom. At Nahant, fruit trees of all kinds have flowered. At Newburyport the same thing has occurred. Most of these premature blooms have appeared in places near the sea-shore, or where the effects of the easterly storm, the last of August, were most felt and are no doubt to be attributed, in a degree, to the above cause. The month of September was not so remarkable for its warmth, as to cause any such premature vegetation alone; but the storm, defoliating the trees, and checking the flow of sap, threw them into a state of rest; the ordinary weather of September started them into new growth, and so rapidly after the premature rest, that it operated like another season, and brought forward the next year's blossoms.]

THE A, B, C, OF SILK-CULTURE.

There will be hundreds of individuals in Virginia who will feed silk-worms during the next season, either on a large or small scale; still, there will be a far greater number to whom it would be fully as convenient, but who will be deterred by different considerations from attempting the experiment. As we feel assured that every one who will make a fair trial will be pleased with the result, and that each small trial will induce more extended operations, we are anxious to persuade as many as possible to make experiments, no matter on how limited a scale of operations. With this view, we will offer a few suggestions, or

small matters of advice to beginners, which may possibly help to smooth away some supposed difficulties. There are no important difficulties, if proper care be given.

For a small beginning, and for success, it is not necessary to have the *morus multicaulis*, nor even the white mulberry, if the experimenter has (and who in the country has not?) enough leaves of the native mulberry tree. It is true, that this is inferior as food to the white mulberry, and that again, as much inferior to the *multicaulis*. But the worst of the three will serve well enough to make a successful rearing. Therefore, the want of the best, and by far the most proper and economical kind of food for large operations, need not prevent a beginning, and doing well, on even the worst kind.

For such small operations, it is not necessary to have any shelves, hurdles, stove, or other of the arrangements suitable and requisite for a regular business. A common dining table will afford enough surface to feed 1000 worms on, to their full growth; and a table may be easily and effectually secured from the invasion of rats and mice, and ants and other insects, which very often destroy the worms and the hopes of the experimenter. The table is so secured by being placed a foot or two from any wall, and far enough from any place of approach whence rats can leap down upon it, and the legs of the table being set in tin-pans of water. Two such tables, connected by rough planks laid from one to the other, would afford a surface sufficient for 5000 worms, which would be enough for a first trial. Thus the second, and what is deemed a great difficulty may be removed.

But supposing that these and all previous obstacles have been obviated by such or better means, and the worms hatched for a rearing, there still remains another difficulty which almost every young culturist brings upon himself, and which causes so much unnecessary trouble and loss of worms, as to weary and disgust many a beginner, before the commencement of the time when much care or labor is really wanting. The young worms are fed so lavishly, that nineteen-twentieths of the food (if not much more,) remains unconsumed, and forms a great accumulation of litter, which soon needs removal. Again, to save trouble (as it is thought,) the leaves are usually given whole. If the leaves are very young and tender, (as they ought to be for very young worms,) they speedily contract in drying, and each, as it curls up, encloses the worms which may be feeding on it. The worms, being so superabundantly fed, have no inducement to move, until after being thus imprisoned, and the leaf has become too dry to be longer fed on. To make this result the more sure,

the young worms eat only the tender green part of the leaf, leaving the numerous and closely crossing fibres like fine net-work. By the time that the leaf is dry, and unfit for food, it thus forms a net, or sack, from which the worm cannot always escape, when impelled by its renewed appetite. Thus many worms are concealed, and damaged, and will suffer, and many will even die in their confinement, unless searched for and relieved; and that operation, with the cleaning away the great quantity of litter in and among which they are enveloped, will, in the first two ages, give more trouble, and cause more loss, than ought to be met with during the whole rearing.

Now all this trouble to the feeder, and injury to and loss of worms, may be avoided by simply cutting the leaves into fine shreds, and sprinkling them on thinly. Then, even if greatly excessive feeding be not avoided, it will do no harm. The worms are not restrained by the breadth or weight of the leaf, and they can easily climb to the upper surface, as is always their disposition. The unconsumed shreds soon dry, which is a great advantage for all that must remain in waste. This dried litter is as loose and open as any bed can be, and when quite dry and sweet, (as it will be usually,) need not be removed until after the end of the second age, at about 10 or 12 days after the hatching. But it is very easy to remove this litter. By feeding the worms at first in narrow strips, or in small squares, or circles, and sprinkling the fresh food at the outer edges of the space, the worms will crowd to the fresh food, and soon leave naked the greater part of the older litter, which may be taken up in masses and separated, from time to time, and thrown away, without picking off or disturbing a single worm. Such will be the course of things even with the most wasteful feeding, (and it is always given wastefully to young worms;) but if the excess of food be less, even this small amount of trouble will be still more reduced.

It is not designed that these suggestions should serve as full directions for feeding even through the two first ages; nor by any means to substitute the full directions to be found in most treatises on silk-culture. The young culturist of course ought to read and consider these, though it will not be necessary to follow each rule. The object aimed at here is merely to remove early and unnecessary obstacles, which serve either to deter from beginning, or to discourage after beginning, nearly all who are inclined to make a trial. These remarks apply to no more than the two first ages. The feeding through the third, fourth and fifth ages requires much more care, labor, and cost; but still will not be difficult, to those who have gone properly through the earlier feeding. Every trea-

tise (of which several are in previous volumes of this work,) will furnish rules of conduct, which, if modified and corrected by the feeder's judgment, according to existing circumstances, will serve to conduct him to a successful result.

But by success it is not meant that the experimenter who feeds 1000, or even 10,000 worms, will make a net profit from his expenditure, and his care and trouble for the time. Such an expectation would be most unreasonable, from any business so small, and yet requiring such frequent and careful attention. Perhaps 50,000 worms, with proper facilities and method, would not require more than twice as much labor or time of attendance, as 5000 only; and the mere waste of the food of 1000, as usually bestowed, might feed 5000, and yet save labor (in clearing away the litter,) instead of causing more therein. If the young feeder loses very few of his worms by accidents or disease, and generally obtains very good cocoons from all others, and finds no great or insuperable difficulty in any part of the operations, then it may be fairly deemed a successful issue, and indicating, with sufficient assurance, a net profit to be reaped upon his next and sufficiently large operations.

There is one caution necessary to be added. It is all-important to have eggs from a healthy stock of worms, and that have been well kept during winter. Whoever has to purchase eggs, incurs great risk of loss on this score. Eggs from a sickly stock will be sure to produce a sickly and worthless progeny; and even if from healthy stock, still improper management in keeping, and especially exposure to too great and too frequent alternations of cold and heat, will cause the worms of eggs so treated to be unhealthy. From such causes, induced either by ignorance or by fraud of the salesmen, nearly all the eggs in this market last year were worse than worthless. Though the danger will be less this year, still there is enough ground for fear to make every buyer very cautious. Many beginners at rearing silk-worms have been discouraged by their mishaps proceeding solely from this cause; and all would, and very reasonably, have been thus discouraged, and made to consider the business hopeless, if other experiments had not been made with good eggs, which served to show the cause of difference. If disease from hereditary taint, or because of diseased eggs, begins to show among silk-worms, it is best at once to throw away the whole; for they will seldom be worth saving. But in this excellent climate, and with proper care in feeding and cleaning, there is little danger of disease from any other source than hereditary taint, or bad keeping of eggs.

MILK THAT WILL NOT PRODUCE BUTTER.

To the Editor of the Farmers' Register.

Can you or any of your subscribers inform me why milk will not sometimes turn to butter after the necessary care and attention to cleanliness, &c. have been bestowed upon it, and the operation of churning continued in some instances nearly a day? For the last six weeks my wife has not been able to make any butter, although we get a very good quantity of milk, which has the appearance of considerable richness. Our milch cows are fed on mangel wurtzel, beet, cabbage leaves, wheat chaff, and wheat bran or corn meal. We have recently been more than unusually attentive to neatness in the management of our milk, and yet, when it comes to be churned, we get no butter. We have been advised by some to throw in a little salt in the churn; by others, soda or a small quantity of buttermilk. We have tried all these remedies, but with no good effect. The milk in some instances as soon as it cools after being taken from the cow, has a bitter twang, which is altogether different from any thing which has occurred to us in that department of house-keeping, after 14 years' experience. I have been informed by a lady who is a native of New England, that such things are not uncommon there, after the cows have grazed on newly-mown meadows. Any information to remedy this evil will very much oblige yours, &c.

[This difficulty is new to us, and we shall be obliged, as well as our correspondent, for satisfactory information on the subject.—ED. F. R.]

BEE MOTH.

From the Cultivator.

Mr. James Thatcher, author of the 'American Orchardist,' &c. &c. in a communication to the New England Farmer, says: "I will embrace this opportunity to communicate for the benefit of the cultivator, what I believe to be an infallible remedy against the bee moth, which has proved so destructive to bees throughout our country of late years. The remedy is simple and easily applied. It consists merely in covering the floor board on which the hive stands, with common earth about an inch thick. A hive set on earth will never be infested with worms; for the bee moth will not deposite her eggs where the earth will come in contact. She naturally resorts to a dry board as her element. The remedy has been employed by a number of persons in this vicinity for several years, with the most complete success.

PROPAGATING DAHLIAS BY BUDS OR JOINTS.

From the Annales d'Agriculture of Lyons.

In the nursery of M. G. Luezet, at Ecully, it is stated, in a report made to the horticultural society of Lyons, that the dahlias are propagated by buds or joints, in the following manner. After a stem has attained the length of from one foot to three feet, according to the variety, it is cut into as many pieces as there are joints. Each piece is then reduced so as to leave a very small space above and below the joint: one of the leaves is cut off,

and the cutting so formed is planted, leaving one of the leaves above the ground, the greater part of the petiole being buried. Shading and the usual routine being attended to, the plants root immediately, and flower the same year:

MANURES.

From the Carolina Planter.

Mr. Editor:—The attention of planters has been much more directed towards manuring within the few past years than formerly—and in some portions of the country the effects are very visible. As to manuring a whole plantation so as to improve every portion of it, that is entirely out of the question for a cotton planter; but it is astonishing how much may be effected in that way.

On all plantations there are some rich and fresh spots, and some poor and old ones. While the former are to be kept up by resting and rotation of crops, the latter, unless there be two great a disproportion, may in time be brought up by manuring so as to establish all on an equality; and even if this cannot be accomplished, a judicious planter may always reap an immediate profit of a very large per cent. on manure procured as cheaply as it may be done. It is surprising how the manured spots tell in the aggregate of a crop. There are innumerable varieties of manure, all of which are found safe and beneficial to corn and cotton; but most of them are entirely out of the question with our planters. Lime, plaster of Paris, marl, and even mud, are attainable but by very few, at a rate that will permit their use beyond a mere experiment,—cotton seed, stable and cow-pen manure, and vegetable compost are, however, *within the reach of all*, and, by proper management, every planter may procure as much of these as he can find time to apply properly. Every one who has cotton seed of course makes use of them for manure, unless, indeed, he permits his hogs and cattle to destroy themselves by feeding on them. This is a most pernicious custom: nothing can be more indigestible than cotton seed, covered, as they usually are, with lint, and sticking together in large lumps in the stomach—besides, they produce an oil, which, though harmless in itself, while in conjunction with the pulp, is as poisonous as the Palma Christi seed is known to be, before the castor oil is extracted. Cotton seed, as an article of food, does much more harm than good—as a manure it is more valuable than any other within our reach—I have more to say on this point which I will defer to another time.

On every plantation, no matter what the size, there should be one of our carts. It is very easy to fit on to them large light bodies, made of slats, which may be removed when necessary. In this slat body, as many oak leaves, and where they cannot be had, as much pine straw, may be packed as a mule can carry. At stated times—at least once a month, and oftener, should there come a wet time, during which the land, as is often the case, is not in condition to be worked, yet the weather good enough to allow hands to go out, the stables and stable-yard—the cow-pen—the hog-pen and the lots on various parts of the plantation, where, if it is a large one, the mules and horses are frequently fed, should be filled with

leaves or straw—occasionally they should be cleaned out, twice a year at least, and the manure thrown up in large piles on a level spot, and in the shade if you can—if not, covered with planks to prevent evaporation. One, or at most two hands, used only occasionally, and hardly missed from the crop, can gather and haul all the leaves. On a plantation of forty or more hands, a cart may be kept running all the time, and one hand thus employed more profitably than in the crop,—with less than that number, perhaps it would be best to trust to taking advantage of the weather, state of the crop, &c. to spare the hands from the field—the manure thus formed, even if the leaves are not thoroughly rotten, is very valuable for cotton or corn.

The negro houses on every plantation should be swept around and under at least once in six months, for the sake of health; throw the filth that is gathered in a pen, as far from the quarter as can be done conveniently; add to it all the weeds cut down, all the corn cobs, all the plucked ashes, and refuse of all kinds: the second year it will be excellent manure. At least once a year all the turn rows and fence corners should be chopped down; let these weeds also, instead of lying to die and waste, be collected in pens, and the manure may be made the first year. Movable pens for stock are admirable for manuring, but they are troublesome and not within the reach of every planter. While the methods of manuring I have mentioned have been practised by all without exception, the experience of many years has shown me that in this way I can obtain, at a nominal cost, one that I never feel at all, as much manure of a very valuable kind as I can haul out to the proper places at the proper period; and that while I am thus adding to the intrinsic value of my property, I am every year most amply compensated for the trouble and expense, by the increase of my crop. I advise every planter to do the same; I do not, however, advise them to purchase manure of any kind; and of this a word hereafter—nor do I recommend them to use those manures which make *no present return*, but postpone their remuneration to a distant and uncertain future. Although entirely opposed to the system of *straining* and *overworking* negroes, land and mules, and believe it to be unprofitable, certainly inhuman, I yet go for as large an income as can be made without such means, and recommend nothing that will seriously diminish an income so obtained for any prospect of gain hereafter; being a firm believer in the old maxim, that "one bird in the hand is worth two in the bush."

SHORT STAPLE.

PRESERVATION OF FRUIT.

From the Annales d'Hort. de Paris.

Dr. Loiseleur des Longchamps preserves apples three or four years, and pears more than one year, by enclosing them in an air-tight box, and depositing it in an ice-house. Previously to placing them in the box, each pear is wrapped in five or six thicknesses of absorbent paper, which, in case of decay, prevents one fruit from contaminating another. Burying the box, which may be of zinc or lead, or perhaps an earthen-ware vessel,

three or four feet deep in the soil, would answer equally well; and even a cool common cellar might be used for the same purpose.

ON THE CAUSE OF THE ACTION OF GYPSUM ON LIMED LAND.

To the Editor of the Farmers' Register.

Cambridge, Md., Dec. 1839.

Reviewing casually the last August No. of your Register, I read, with some attention and much pleasure, an essay of "Senex" "on the cause of greater value of gypsum on limed land."

In the general sentiments of the writer, incidentally communicated, I heartily concur; but I must take exception to his theory in explanation of the fact above stated, as the chief purpose of his communication.

His remarks upon the absurdity of the application of carbon, in substance, as a manure, from its insolubility in water, are undoubtedly correct; it is certainly from the carbonic acid alone that vegetables derive their carbon; yet this is not wholly through the roots of the plant, as he suggests, but partly by the *respiration*, through the *leaves*, of atmospheric air, containing a portion of it; I apprehend, too, that he inadvertently remarked, that the sap, "as it *passes up* through the tubes of the vegetable is decomposed," &c. &c. He is no doubt acquainted with the fact, that the sap continues *unaltered* until it arrives at the *leaves*, where it is elaborated for the *secretions* and *growth* of the plant.

His sentiments of Prof. Armstrong's "Essays on Vegetable Physiology," and his recommendation of them to the reading public, cannot be too often, or too earnestly repeated; to which might be profitably added those of Prof. Lindley on the same subject. Without a good general knowledge of the science, the great interest of agriculture can never be advanced. Now, to his theory "on the cause of greater value of gypsum on limed land." I take the chief exception.

It is my present *chief* purpose to demonstrate, that his theory, which, he says, has been so long satisfactory to himself, is *unsound* and *unphilosophic*; and secondly, and concisely, to offer a substitute which I consider more consistent with settled chemical laws.

The theory of "Senex" is unsound and unphilosophic, being wholly founded upon a supposition which I will prove erroneous—"of the mutual action on each other, of the gypsum (sulphate of lime, or plaster of Paris) and of carbonate of lime"—by means of which "mutual action," he says, "the vegetables growing on the soil, will obtain an ample supply of carbon, and grow as they had never been seen to grow before."

The erroneous position assumed by him, of the "mutual action" between the sulphate and carbonate of lime, has led him into his false course of reasoning; and necessarily into the false conclusion, "that the plaster will facilitate the extrication of the carbonic acid," &c. Thus, that the sulphuric acid of the plaster, when this substance comes in contact with the carbonate of lime, previously applied to the land, quits its base of lime, seizes the carbonate of lime, and extricates the carbonic acid, which is thence free to enter the

vegetable and furnish "an ample supply of carbon" for its nutriment and growth. *Such must have been his course of reasoning.*

Sir, under a settled, technical rule of chemical law, the sulphuric acid of the plaster will have combined with the lime, its base, in *definite proportions*; and the addition of more of the same base to the acid, or of more of the same acid to its base, will produce no chemical action whatever; nor will the circumstance, that the lime added contains carbonic acid, enable it to *exert any influence* upon the plaster (sulphate of lime); for no set of double affinities can possibly, in this case, operate to produce the "mutual action" on which "Senex" builds his theory; because, the base of the plaster is already possessed of the equivalent of its acid; and it will neither take more nor part with its own; and its base and that of the carbonate being the same substance, and, moreover, the acid of the sulphate being stronger in its affinity, as regards the common base, than that of the carbonate, there can be no play of double affinities between them; and consequently no decomposition, or "*mutual action*," can possibly occur; and hence the theory of "Senex," and his exposition of the "cause of greater value of gypsum on limed land," are *radically and palpably erroneous*.

The solution which I propose is simply and concisely thus: the oxalic is the only acid which will act upon sulphate of lime; this acid is present in the "sorrel and peat," and in all lands which produce the "sorrel and peat;" this acid may, when present in lands, prevent the action of sulphate of lime, by its known action upon this substance, by changing its constitution, and consequently its character, from a *sulphate* to that of an *oxalate*, whose virtues, as a manure, are not known; and thus, it may, and will of necessity, defeat the action of the "*sulphate*."

By the addition of lime, previously to that of "plaster," the oxalic, or possibly other acid, if any in the land, will be neutralized by the lime, and the plaster will be protected in its constitution, and proper character; and thus it will be enabled to perform its office as a manure, *sui generis*; at least, so far as the lime, previously applied, had been sufficient to furnish an equivalent base to the oxalic, or, possibly, other acid in the land; and hence the "cause of greater value of gypsum on limed land." *Quod erat desideratum.*

In the consciousness that I have no motive for my critical review of the paper of "Senex" but that of correcting what I consider erroneous, and, moreover, that I find much to admire in his paper,

I have the honor to be yours,

JOSEPH E. MUSE.

BIG SQUASHES.

From the Boston Journal.

We lately stated that a squash was exhibited at the Horticultural room in Boston which weighed 115 pounds! This we thought a pretty large one; but a New Heaven paper chronicles one raised by R. Johnson, of Middleton, weighing 150 pounds. This, thought we, on reading the paragraph, is surely a monster, and Massachusetts must give

* See 'Essay on Calc. Man.,' 2d ed., p. 92, where our view of this subject is presented.—ED. F. R.

way. We reckoned without our host, however, for a squash raised in Lincoln, by Daniel Weston, may now be seen at the provision store of William Clark, in Court street, near Bowdoin square, weighing one hundred and sixty-one pounds avoirdupois! Who can beat that?

AN ESSAY ON THE BEST AND CHEAPEST MODE OF RAISING AND FATTENING PORK.

From the Maine Farmer.

After a suitable building is prepared for a pig-gery, the farmer who wishes to enter into the pork-raising business, should select a thrifty variety of swine for his purpose. Experience has abundantly proved that the large-boned variety are not the best or most profitable kind, nor are the small Chinese or Newbury white breed the best for him who has a plenty of food for his swine. In this, as in most other pursuits, the middle way is best. Here it may be well to remark, that no animal improves more by crossing than swine. A judicious selection should be made of females or breeders. It will be found that there are generally some in every litter that are not duly mixed. An indiscriminate preservation of sows for breeders should never be done, for much, very much depends upon the form, disposition, &c. None should ever be allowed to have a second litter which were uneasy, which devoured their offspring or were cross to their pigs. In regard to breeding; it will be necessary to observe that a suitable place should be prepared for them to bring forth in. If the time of farrowing is in cold weather, the pen should be made warm and comfortable. The straw furnished them should be cut or made small or short, and not much in quantity, lest the pigs should be suffocated or destroyed by being overlaid when they have crawled under it. It may also be well to remark here, that sows go with young sixteen weeks, and are more exact in the time of their gestation, than most other females. The owner should note the time that the female has been to the male, and also when the sixteen weeks will expire, in order that he may know when to pay particular attention to the sow, and put her in good condition for farrowing. In England, old males and females are considered the best for breeders, provided they are not over four years old.

I am satisfied that this is true. I also know by experience that they should not be kept very fleshy or fat.

In regard to the time when pigs should be brought forth, in order to be most profitable, there is a diversity of opinions among breeders. I am of the opinion that pigs that come in September are the most profitable for wintering, in order to be fattened during the next fall. Those that come in the spring, eat during the summer what other hogs should have. They also eat much more in the winter, than those which come in September, and, in fact, they will eat more during the next summer. As all young animals mature fast at a certain age, the September pigs will, when fattened and slaughtered at the usual time, weigh nearly as much as the earlier ones.

Some suppose that very early pigs, say such as are farrowed in March or April, are profitable to raise and butcher in the ensuing fall, but it takes

nearly as much to fatten them as the others. It may be as well perhaps, for those who live in towns and cities, and have a cow to eat the slops &c. from their kitchen during the winter, to keep an early spring pig and kill him in the fall, for their own use; but for the person who raises any thing that will answer for food for pigs during the winter, and who wishes to carry pork to market, this course will not be very judicious, as this kind of pork will seldom bring so much in the market as older and larger kinds.

In regard to keep, I am wholly opposed to planting and hoeing Indian corn for our swine, even to fatten them on; especially since roots of various kinds, with less labor to the acre and with an amount of nutriment three or fourfold more, can be produced among us. Barley is easily raised without the aid of the hoe, and is an excellent food to fatten swine upon. I consider it nearly as good as Indian corn. Peas are better than either. Advantage may be taken of them by having a succession of crops. This can be effected by sowing them at different times in the spring of the year. Let them mature sufficiently to be fit to boil green, then prepare a portable fence so as to enclose a certain space—into this turn the hogs and thus move them from place to place as they eat off the crop.

They will thus fatten so much as to need very little more to make them excellent pork at killing time. No manure of any consequence may be lost by this course, especially if your peas are upon good arable land which may be turned over by the plough in the fall. A great saving in food may also be effected by turning them out to pasture. If you have a good clover ley, they may be put into it about the 25th of May, and will live very well until your peas are fit to be eaten off. Besides the food which they obtain, the exercise and air is of great benefit to their limbs and health. An orchard, even if not on arable soil, and which cannot be ploughed, is an excellent situation for them, especially if they can also have access to good running water. Hogs will benefit an orchard much. They stir and enrich the soil, destroy insects, and render the trees more productive, while the early wind-falls are thus converted to food without much trouble.

Among all the kinds of cheap food for swine none are better or more economical than apples gathered in the fall. If cooked and fed to them regularly, with a little meal, they will nearly fit them for the knife, and if a little corn meal, or meal of barley or peas and oats be added, the work is done.

When in their pens, during the winter, they should be fed twice per day, at given times and at no other, with warm food. In longer days they should be fed three times per day, viz: at morning, noon, and night. By being regular in the times of feeding, they will not expect it at any other, and will not be uneasy. Young pigs, when taken from the sow, should for a short time be fed regularly four or five times per day, and gradually taken off three times.

Every man who keeps hogs should prepare his piggery for boiling or steaming food, and have their food cooked and dealt out to them warm and in exact quantities. Their swill should be occasionally salted and a dose of sulphur mixed now and then with it. Charcoal or rotten wood should

also be allowed them to eat whenever they desire.*

I have recommended that their food when fed out to them should be cooked and warm, yet I have found by actual experiment that ruta бага, given to old breeders, raw, will keep them in very good condition during the winter. I have also spoken of apples, many object to sour apples as being improper food for swine, but this is a mistake. If you bruise a sour apple you will find the taste changed very much. Boiling or grinding changes these apples or their juices so that they are as valuable as sweet ones and they are found to contain as much saccharine matter as some sweet ones.

Pumpkins raised by themselves on good soil make much more profitable and excellent food for swine than many have believed.

I have no doubt that ripe pumpkins cooked and properly fed to swine are worth as much, pound for pound, as potatoes. I never raise oats for swine. They are a poor, light, chaffy grain. Their average yield is about thirty bushels per acre, while barley will yield as much or more, and one bushel of it is worth more than three of oats for hogs. They are often sown among peas to prevent the peas from lodging, but although you begin with but few among your peas, they will gain upon them, and in time your peas and oats are nearly all oats, and in my opinion poor keep for swine. Some other substitute to prevent the peas from lodging should be used. Rye, for instance, is much better, and the crop when harvested far preferable.

Lodging or sleeping pens. There seems to be too much inattention to the comfort of swine as it regards their lodging or sleeping comfortably. Although in warm weather, hogs like to wallow in the mire and filth, yet they like to sleep warm and dry, especially in cold weather. When you commence fattening them, which should be in September, give them a warm dry apartment to sleep in. I would also recommend that they should be kept in darkness. They will thus be less annoyed by flies and kept from hunting after external objects which will make them uneasy.

Weaning the pigs. If you have an abundance of food for the sow, it will not be disadvantageous or unprofitable to let the pigs remain with her until they are eight weeks old. The usual custom however is to take them off when four weeks old, and they do very well if they can have milk fed out to them for some time. Indeed they often do well if taken from the dam at a few days old, if they can be well supplied with warm milk from the cow. Close attention should be paid to them while weaning, lest they become poor and their digestive organs become deranged. It is hard bringing them up to a good state of health and flesh when this has once taken place.

Profits of pork-raising. I have no doubt that pork-raising may be made the most profitable of any stock or meat-raising business in the state; and I had almost said of any other branch of husbandry or farming. Certain I am, that if the right process be pursued any reasonable quantity of it may be raised, pound for pound, cheaper than beef. Pork generally goes into the market at a year and a half old, whereas cattle must be kept much longer.

A considerable profit may be made by salting

* In cases of scouring, as young pigs will often, when first taken from their dams, give them some liquor of oak bark or dust from a bark mill mixed with their food.

pork. Very few are aware that pork increases very much in weight by being salted, but it has been proved by experiment, that it will actually gain in weight 15 or 20 per cent. This should be generally known, that people may not be led to sacrifice their pork when it is low in the market, but salt it. The other parts of the hog, not usually packed down, may be made into bacon, sausages, &c. and then sold at a higher price than in the "round hog."

Calculation of profits. It may be desirable to have an abstract of the expenses and profits of pork raising. This must vary, as every one knows, according to the different locations as it regards markets, as well as the different situations and chances for feeding, &c. The following may be given as a sample or general estimate.

1st. We will suppose the pig comes in Sept. and is slaughtered when 15 months old. We will suppose that he has been kept upon barley meal or potatoes. If kept upon barley 455 days (the time of his life) at four quarts per day, he will devour 56 bushels and a fraction, and suppose he weighs 300 lbs. 56 bushels at 70 cents per bushel is

39,20
300 lbs. of pork at 7 cents is
21,00

\$18,20 loss.

This allows the cost of tending &c. to be paid by his manure.

2d. Suppose you keep him 455 days on potatoes and he averages 1 peck per day he will eat during his life time 113 bushels, which at 16 cents per bushel will be

\$18.08
300 lbs. pork at 7 cents is
21,00

2,92 gain.

Thus you see that it becomes necessary to pursue an economical system. To put into him all such food as he will eat to advantage and which will cost the least, and to make him also *earn* his living, if possible, from the time he is able to root until he is slaughtered. Suppose you take your pig in September. He will, if you give him the material to work upon, immediately commence operations in manufacturing manure. Give him apples, grass, weeds, potatoes &c. with a little oat and pea or barley meal. Keep him growing during the winter. I would suggest the idea of having a plat of ground, say 1-4 or 1-2 an acre, planted to artichokes. Peas and artichokes may be planted together in drills in the spring. They will grow together—the peas gathered, and the artichokes suffered to remain. Early in the spring following turn your hogs in and let them root among them. This will keep them in part, until the 25th of May, when your clover will be large enough to be cropped by them. This will sustain them almost wholly, until your peas are fit to be eaten off, when they may be turned in upon them and there fed until the grain crops are harvested, and you are ready to begin the fattening process. Then cook your apples, your rutabagas, pumpkins &c. In this way a hog may be kept from weaning time until he is fifteen months old, on most of our farms, for 12 dollars. He will make you ten loads of first rate manure, worth, after deducting expenses of furnishing him with material, one dollar per load, and the account current with him will stand thus:—

Porker, Dr. to board, &c. 15 months, \$12,00

Sundries,	3,00
	15,00
Cr. By 300 lbs. pork, at 7 cts. per lb.	\$21,00
10 loads of manure at \$1,00 per load,	10,00
	\$31,00
Balance in favor of porker,	\$16,00
SAMUEL WOOD.	

MACHINE FOR HUSKING [OR SHUCKING] AND SHELLING CORN.

It is stated in the Maryland papers that a machine has been introduced for husking, or (as we Tuckahoes say) *shucking* corn. A correspondent of the American Farmer says that this machine "which has excited much admiration on the Eastern Shore of Maryland for two years past, was invented and put in use by Mr. Hussey, the inventor of the reaping machine," of which statements have been given in the Farmers' Register. The same writer says that many farmers there, with the former machine, have shucked and shelled their corn "at the rate of 40 bushels of shelled corn per hour; and of 100 bushels per hour of corn previously husked." This, if correctly described, must be a very curious as well as valuable machine; and we are surprised that so little progress has yet been made in extending information concerning, as well as the use of, both those machines of Mr. Hussey's. If he will bring them and exhibit them in operation in lower Virginia, and they prove deserving of their recommendations, he will find many purchasers.—ED.

FAR. REG.

DRAINAGE OF LANDS BY STEAM POWER.

From the Durham Advertiser.

The drainage of land by steam power has been extensively adopted in the fens of Lincolnshire, Cambridgeshire, and Bedfordshire, and with immense advantage. A steam engine of ten horse power has been found to be sufficient to drain a district comprising 1000 acres of land, and the water can always be kept down to any given distance below the plants. If rain fall in excess, the water is thrown off by the engine; if the weather is dry, the sluices can be opened and the water let in from the river. The engines are required to work four months in the twelve, at intervals varying with the season, where the districts are large; the expense of drainage by steam power is about 2s. 6d. per acre. The first cost of the works varies with the different nature of the substrata, but generally it amounts to 1l. per acre for the machinery and buildings. An engine of forty horse power, with scoop wheels for draining, and requisite buildings, costs about 4000l., and is capable of draining 4000 acres of land. In many places in the fens, land has been purchased at from 11l. to 20l. per acre, which has been so much improved by drainage, as to be worth from 60l. to 70l. per acre.

CULTIVATION OF COTTON.

From the Carolina Planter.

Report on the cultivation of cotton, read before the Pee Dee Agricultural Society, at its semi-annual meeting in October, 1839, by the Hon. John Campbell.

The first object of consideration in the cultivation of cotton, is the selection of a soil suited to its production. But as every variety of soil within the limits of the Pee Dee country, of sufficient fertility, is found, under a judicious system of cultivation, to yield a good return for the labor bestowed upon it, and as a committee has been appointed by this society to report particularly upon manures, it is thought unnecessary to make any comment upon this branch of the subject: except to remark, that from an exhausted soil, or one naturally poor, and unimproved by art, it is in vain for the planter even with the most favorable seasons, to expect an abundant harvest.

The fields being selected and the proper season having arrived, the first operation is to prepare it for planting.

In properly preparing land for planting short staple cotton, good ploughing is indispensable, and among the rules which may be laid down as admitting of no modification are these: Every part of the soil should be turned and effectually pulverized; and the depth of furrow on all lands should be regulated by the stratum which divides the fertile from the unfertile moulds. Therefore, in the breaking up or preparing of land, the plough may go as deep as the soil will admit, but not deeper, and from the violation of this rule, which nature has provided as a criterion, thin soils are sometimes much injured.

Light and dry moulds that are easily pulverized may be ploughed immediately before planting. But on clayey soils, where the extremes of wet and dry present the disagreeable alternatives of mire or clods, the best season of ploughing is often short and critical, and such soils should, when practicable, be ploughed early in the winter, that they may by the action of the frost be rendered friable and more easy of cultivation.

The usual and best method of planting cotton is on ridges, the centres of which vary in distances from three and a half to seven feet, in proportion as the soil is more or less fertile. The ridges being widest upon the more fertile soils, where, from the larger size to which this plant attains, it requires the greater distance to admit the influence of the sun and the circulation of the air. Upon all soils the observance of this rule is important, but particularly upon such as are backward in bringing cotton to maturity. The ridges are formed according to circumstances either by the plough alone, drawn by one or more horses, or by the plough and hoe.

The land being thus prepared, the object is to plant.

Cotton being produced in all the southern and south-western states, over the territory embracing a considerable variety of climate, is planted at different times from the middle of March to the first of May. As a universal rule, however, it may be remarked, that the planter should select the earliest period that is consistent with safety. Confident that, let human systems vary as they may,

the approach of the season which wakes up the vegetable creation from the sleep of winter, and by its genial influence gives it life and beauty, is regulated by a steady hand—and grateful when he commits his seed to the earth, that if he discharged his duty in preparing his land for their reception, his labor will not be in vain. In the region embraced by the Pee Dee Agricultural Society, the best time for planting is during the month of April, commencing about the second week and completing the operation as soon afterwards as practicable. It rarely, indeed it almost never, occurs, where lands have been well prepared, that there is a failure in the stand.

The seed are planted either in drills, in checks, or in chops. But the most usual and convenient method when seed are abundant, is to sow in drills run on the tops of the ridges and to cover lightly with a plough constructed for the purpose. If the weather is moist and warm the plant will appear in a few days; if the contrary, the seed will remain for weeks without vegetating. The stand of cotton is sometimes injured by heavy floods of rain falling shortly after planting, succeeded by drought, forming a crust on the drill which the vegetating and seed are unable to penetrate. Light soils are not subject to this evil, and on stiff lands it may in a great measure be avoided by sowing the seed and leaving them exposed until after a rain, when they should be rapidly covered while the earth is friable. The moisture absorbed at such a time will occasion the seed to vegetate before another rain has fallen and another crust has formed.

After the plants are up, commences a most important part of the cultivation; and here the committee will remark, that practical results on the culture of cotton are varied so much by circumstances, that it is impossible to lay down rules which will be of universal application. But depending almost entirely upon experience and observation, and very little upon theoretic reasoning, every judicious planter will be regulated in the management of this crop by the condition of his field. The first process, however, after the cotton is up, is generally, in common language, "to chop out."

This operation is performed by drawing the hoe rapidly across the drill at short intervals, leaving between each chop three or four plants. The plough immediately follows, running as near the drill as practicable without covering or otherwise injuring the plants. The hoe succeeds, removing the grass which by this time begins to appear, reducing the plants if of sufficient size and vigor, to a single stalk a place, and drawing around them a little mellow earth. The plants will now stand in the drill from ten to twelve inches apart, and if this hoeing is well done the principal difficulty in the cultivation of the crop will already have been surmounted. If, on the contrary, it is negligently performed (as is too frequently the case) the planter, if fully cropped, may expect much vexation in its subsequent cultivation.

The first ploughing is generally performed with two furrows to the row, leaving a narrow ridge of not more than six or eight inches to be worked by the hoe. In the second ploughing the intervals between the ridges should be effectually ploughed out, and the fresh earth thrown lightly around the lower part of the cotton stalks. Every subsequent

ploughing should be performed in the same manner, with an increasing particularity as the plants increase in size and approach maturity, not to run deep and near, lest by so doing the lateral roots, which are thrown out in search of food, should be injured, and the circulation of the sap too much checked. Ploughs of various models are used in effecting the same results, but it is deemed unnecessary to enter into a description of them or a description of their relative adaptation to the objects intended. Every planter in the selection of ploughs will of course be governed by his own observation.

The cotton crop should be worked at intervals of not more than three weeks from the commencement to the termination of its cultivation, and success depends not less upon the judicious and skillful management of the hoe than of the plough. There is however much greater uniformity in the method of using this implement; and it may be remarked, in general, that where the soil is mellow and in good condition, it is sufficient to remove the grass where the plough cannot reach it and to draw a little fresh earth to the plant with the hoe where the beds are hard; its province, in addition, is to loosen the surface.

With a view to the increase of productiveness, many planters are in the habit of topping their cotton, and there is no doubt that where this operation is performed in time, it produces good results. The plant when its upward growth is checked by this process, yields more of its circulation to the support of its lateral branches and to the nourishment of its fruit.

The committee deem it almost unnecessary to allude to the great importance of having the cotton gathered as soon after it has opened as is consistent with a proper regard to the attention due to other interests on a plantation. Every planter of observation must be convinced of the great loss in weight, and in the deterioration in quality, sustained by cotton, from long exposure in the fields to the storms and frosts of winter.

The cotton plant is well known to be subject to a great variety of diseases, some of them appearing in the plant and others in the fruit only. Some have supposed that all of these diseases proceed from insects. Many of them no doubt do; but experiments have proved the existence of a circulatory system in the vegetable as well as in the animal creation; and it is known that, like animals, vegetables extract a fluid from whatever substances are applied to the organs through which they receive and digest their nutriment, that may either tend to promote their health or produce disease. Hence it is obvious that the health of vegetables like that of animals may become injured by drawing within their circulation deleterious or poisonous qualities, and that the rot and other diseases in cotton may be attributed to this cause. This alone, combined with the circumstance that we have not yet been able satisfactorily to trace the causes or provide against many of the diseases to which cotton is liable, shows the importance of an improved state of agricultural knowledge—knowledge, the advancement of which has no doubt been much retarded by the secluded state in which the cultivators of the soil have generally lived, and the want of that patient and continued observation necessary to understand the process of vegetation, and to remark intelligently upon the

different results of the application of different soils and manures, and the effects of other external agents to which the plant may be subjected. A state of things which it is hoped that this society, now in its infancy, will have some agency in removing within the limits of its influence.

The cotton plant under the name of *Gossypium* has been historically known since the time of Herodotus, the father of profane history; but so recent has been its cultivation in this country that many now living can recollect its introduction among us as an article of commerce. It would be foreign to the objects of this report to refer to the important influence which in its processes of cultivation, manufacture and sale, this article is now exercising on the destinies of the human race. But in illustration of the extent of its cultivation and of its value, the committee will briefly refer to the last report of the secretary of the treasury, containing a statement of the annual commerce and navigation of the United States, commencing on the first of October, 1837, and ending on the 30th September, 1838. According to this report, the entire exports of the domestic produce of the United States amounted for that year to \$96,033,821. Of this amount the export of raw cotton alone amounted to \$61,556,811 and manufactures to \$3,758,755, making in all \$65,315,566, and leaving less than \$31,000,000 for the exports of the domestic produce of the whole union besides, including the contributions of the earth, the forest and the sea, agriculture and manufactures. Thus we see that the single article of cotton alone, raised exclusively in a section of country containing less than a third of the population, constitutes in value more than two-thirds of the export of the domestic produce of the United States.

To the support of the pre-eminence, which, under a fortunate combination of circumstances, we have obtained as to the cultivation of cotton, we are mainly to look not only for individual prosperity, but for the permanence of our commercial and political importance, and this pre-eminence is to be preserved not so much from our local advantages, as from a perseverance in that enterprise, industry and skill which have placed the competition of other regions, not less favored by climate, at a distance, and given to us the command of the world.

THE WEATHER.

This has been the most severe winter, and the most unfavorable to farming operations, of all within our recollection. In the beginning of winter there was an unusual quantity of rain, and since, of snow, but still more unusual excess of ice-bound earth and water, and of severe cold. In our thermometer, in Petersburg, at the outer extremity of a north porch, the mercury was 9 degrees below zero, before sunrise, on Jan. 19th. On the 2d, the weather was seemingly as cold, at least, but we did not observe the thermometer until 15 minutes before 9 A. M. when it was precisely at zero. Scarcely any farm labors have been performed since Christmas, and all preparations for the next crops are necessarily very backward.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

The commencement of the year found the navigation of our rivers closed by ice; and such was the accumulation at Richmond that it has not yet disappeared. The receipts and shipment of goods and produce having thus been suspended, except so far as it could be effected by rail roads, the business of the month has been much smaller than usual; and the resources of the mercantile community being in a great measure cut off, money has been exceedingly scarce. Advices from Europe have also been retarded: the steam packet which was to have left London on the 1st January, not being yet reported.

Prices of most articles have declined. Tobacco about 75 cents per 100; cotton about one cent per lb. The general sales of tobacco are from \$3 to \$6 for lugs, to middling leaf; good and fine would of course command higher rates. Cotton 8 to 10 cents, being higher than in any of the southern ports; in these the range of sales is generally between 7 and 9 cents, but in the interior markets as low as 5 to 7 cents, which is the quotation at Columbus, Georgia. The crops in that part of the country and in Alabama cannot be got to the ports of shipment, owing to the low state of the rivers. The quantity produced exceeds that of any former year, and threatens to overstock all markets. Wheat and flour have advanced within the

last week; the former may be quoted \$1 10 to \$1 18 per bushel, and flour \$6. The export of both articles to Europe is unusually large; and it is fortunate that there is such an outlet, as the quantity which will be brought to market from the west must be very great.

Indian corn may be quoted 50 to 55 cents per bushel. Some small shipments making to European markets.

Stocks of almost every description are much depreciated, and the enormous frauds, in some banking institutions of the large cities, which have been recently disclosed, tend to shake confidence in them. X.

January 30, 1840.

CROP OF JAMAICA.

The Jamaica Royal Gazette of the 21st Nov. estimates the deficiency in crop of the Island of Jamaica at one third the exports of last year. The falling off, as shown by official returns, has been on the following articles:—On sugar to the amount of 18,135 hhds. 3,070 tierces and 1,510 barrels; on rum, 9,826 puncheons, 165 hhds. and 396 casks; on coffee, 2,897,974 lbs.; and on ginger, 1,542 casks, and 1,062 bags. These deficiencies, it is stated, have resulted from the want of labor (not laborers,) to take off the crops. The seasons have been favorable and productions abundant.

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FEBRUARY 29, 1840.

No. 2.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

DESCRIPTION OF STRATHNAVER, MORVICH, AND CULMALLY FARMS, IN THE COUNTY OF SUTHERLAND [SCOTLAND.]

Communicated by Patrick Sellar.

From the 'Reports of Select Farms.'

Introduction.—The county of Sutherland is situated in the 58th degree of north latitude, parallel to Gottenburgh in Sweden, and Labrador in America, and not two degrees further south than Cape Farewell in Greenland. Its climate, and its productions, and the style of farming followed to bring these last to maturity, must differ, in many particulars, from what prevails in England.

It consists of a peninsula, nearly of a square form, washed on the west by the Atlantic, on the north by the Great North Sea, and on the east and south-east by the county of Caithness, and by that portion of the German ocean called the Moray Firth. The exhalations which are produced by these great bodies of water moderate the rigours of winter, and the heats of summer; causing at the same time a dampness during every season, more especially in the vernal and autumnal equinoxes, favorable to grass; but not in every year propitious to the sowing or the ripening of corn.

The centre and east portion of this district, excepting a narrow stripe along the south-east coast, scarcely two miles in breadth, rests on mountains of gneiss and micaceous schistus, with here and there a mass of primary limestone, or a bluff hill of old red sandstone* placed upon it. The whole is broken into abundance of wild, and, on the west coast, savage scenery; subdivided by many lakes and streams of water, and covered chiefly with peat bog, on which grow the eriophori, carices, junci, erica, and other alpine plants, given in his kindness by providence to those countries, where the extreme length of winter and the absence of spring forbid, during a great portion of the year, the vegetation of plants of a more feeding, but less hardy nature.

The tillage farming of the county may, with one exception on the north coast in the limestone

* The old red sandstone on the west coast extends from Clachtoil in Assynt on the south, to Culkein on the north. It includes the lofty interior mountains of Soubhain, Canisp, and Quenag. From thence to island Handa the coast is composed of round, lumpy hills of gneiss, stretching up to the base of the lofty quartz mountains of the Diriemore. The coast north therefrom, to the vicinity of Cape Wrath, which is granite, is composed of the old red sandstone. To the east of the Cape it is again found, forming the lofty cliffs of Clochmore and Far-out-head. The mountain limestone also forms two considerable ranges; the one commencing on the north coast at Ellan Garrow, running to the south of Far-out, extends to the point of Sangoemore, stretching into the interior to the west summit of the lofty mountain of Ben Spiunnine. The next stretches along the greater portion of Loch Eribol, and includes Ellan Choirie to the top of that sea loch. The rest of the county comes within the general description in the text.

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district, be said to be limited to the south eastern stripe of coast above mentioned; where the gneiss changes into sandstone, and where breccia of various combinations, and coal measures, are tumbled together in great confusion, and covered with debris from the neighboring mountains. Here there has been formed a soil, consisting of loam of different depths, approaching in some spots to coarse alluvial matter of considerable tenacity, but all of it adapted, when limed, to the growth of heavy crops of turnips.

The mountainous part of the country is placed chiefly under sheep. It exports annually *one hundred and eighty thousand fleeces* to employ, and *forty thousand sheep* to feed, the English manufacturer. The shores abound in fish, and its fisheries afford more than *fifty thousand barrels of herrings* to the same end; that is to say, either for direct consumption in England, or for Ireland, where they set free an equal value of food better adapted for the English market. The part of the country employed in tillage, exports to the south country several cargoes of corn, some choice Highland whisky, and a good many droves of cattle; but it is chiefly available for the esculent food, and the refuge during winter which it affords to the weaker portion of the flocks that occupy the great extent of pastoral country, with which it is by the wise provision of nature connected.

Of the above-mentioned agricultural produce of the county of Sutherland, the writer of this report may annually export about one-twentieth part of each of the above mentioned species of produce, varying in amount according to the nature of the season, and the skill and industry of the persons employed in directing, superintending, and carrying through the operations necessary to improve the quality and preserve the health of the stock, in raising the necessary food, and in defending it against the effects of climate.

He will proceed to describe—1st. his farms, which belong in property to the Marquis and Marchioness of Stafford, and he will explain,

2dly. The management employed in each department to bring out and realize the produce.

Description of farm.—The first and most important part of the farm possessed by the reporter is in Strathnaver, a tract of mountain land, on the north coast of the county, in latitude* 58° 30', situated betwixt Loch Naver and the sea. The river Naver runs through it from south to north, and it extends, at its greatest breadth, from Loch Laygal on the west, to Badanloch on the east.

The pasturage consists of a great variety of plants, singularly adapted to the maintenance, during every month of the year, of the only domesticated animal possessed of a cover adequate to defend it by day and night from the effects of such a climate—so light in weight, as not to sink in the peat bog where it finds its food; and with power and instinct to *spieft* the inaccessible crags, with which such a country abounds.

* Within about one hundred miles of the latitude of Greenland.
† Climb.

Where the waters, by cutting out ravines, glens, and straths, have formed an alluvial soil, composed of the debris of the mountain rocks mixed with peat, there the finer sorts of plants appear. These plants vary according to the quality of the component parts whereof the soil on which they grow consists. On spots, for instance, where the decomposing felspar abounds, some natural clover, rye-grass, yarrow or millefoil, mountain daisy, primrose, and other plants of first quality are discovered—mixed with the *hoccus mollis*, *agrostes*, *airs*, &c. which are natural to the decomposing mica—with the fescue grass, brome grass, common bent, heather, *et hoc genus omne*, which is content with the nourishment to be derived from the sterile bank of quartz gravel. In this respect the pastures of the county of Sutherland possess an advantage over many tracts exhibiting a more flattering outline; and with the ever varying proportions and combinations of matter contained in its gneiss, there is throughout the country an infinite mixture of the plants best suited for the maintenance of 'keeping stock' during every season of the year; which grasses, by the irregular bursting out of rocks in a state of partial decomposition, and by the serpentine course of burns and waters, are ultimately interwoven with the alpine plants that grow upon the peat-bog, and form the principal part of the maintenance of the stock.

Of these alpine plants, there exists a considerable number and variety. On the knolls, the heather (*erica vulgaris*) prevails. It fills with seed, ripening in all seasons of ordinary fertility, like a field of corn,* and forms a principal part of the food of stock, during the wet months of October, November, December, and January. In exposed situations, the shepherds burn it, and the sheep eat the young shoots in August and September. In lower positions it is left to come to greater length, so that the sheep may work down to it in time of snow, and in order to afford shelter in lambing time. Adjoining to the heather, the sheep find, on the peat of damper and deeper quality, the ling (*erica tetralix*), cotton grass (*eriphorum vaginatum*), rasp grass (*carex cespitosa*). The leaves of these plants they consume along with the heather, during the autumn and winter months. In February the heather has lost its seed. It is succeeded by the pry (*carex panica*), the stool bent (*juncus squarrosus*), and by thick beds of the flowers of the cotton grass, which are found in the latter end of February, and beginning of March, pointing with great vigor to the cheerless sun of that wet and uncomfortable season. These plants continue in use, until the second or third week of April; and during all this time, they furnish for keeping stock, food of the best quality and in the greatest abundance. From this date to the middle of May, a link is in this country wanting in the chain of alpine eatage. On well drained and moderately stocked ground, the finer qualities, which in this season begin to spring, supply the defect, but under different management, the 'hunger rot' and a train of consequent ills sometimes ensue. In the middle of May, however, the deer hair (*scirpus cespitosus*) takes the place of the moss. It shoots through

* In 1816 it filled very imperfectly, and the consequences to the flocks were deeply felt during the ensuing winter.

the ground like a thick braid of corn, and with the fine grasses, by this time in full vigor, provides for stock most abundantly, until the month of August; when the ground is lightened by the departure of the annual cast or sale lot of sheep; and the young heather and ling come again into play.

The next part of the concern, comprising Morvich and Culmaily, consists of a tract in Strath Fleet, and on the shores of the south-east coast of Sutherland. On the south and west it rests on the sides of a pretty considerable chain of mountain, composed of inclined red sandstone, called Bhen Bhraigie and Bhen Lundie. That part of this farm which falls down on the south side of the mountain, to a flat of more than four hundred and fifty imperial acres of tillage land, is Culmaily Farm; and is chiefly composed of a sharp gravelly black loam, incumbent on sandstone of very compact quality, and on the debris of the sandstone and gneiss rocks, which abound in the neighborhood, mixed up with some sea sand and calcareous matter infused into the mass, at some remote period when it must have been covered with salt water. The other part, which is on the west side of the mountain, is barely within the gneiss district; it descends to the base of a precipitous mass of rock, composed in a great measure, of amorphous felspar, at the bottom of which is the alluvial flat of 'Morvich,' formed of a deep and pretty strong clay loam, in some part covered with moss, and measuring better than two hundred imperial acres of tillage land.

It is not immaterial to the reader to know, that of these tillage farms, full two hundred and fifty acres have been converted from moor, moss, and pasture, into tillage land, by the reporter, and that he has thoroughly manured the whole six hundred and fifty acres with lime imported from England; and he mentions these facts here, in order to afford him this opportunity of adding, that he was induced to make such extensive improvements by the liberal terms granted in his first lease, the unsolicited addition of nine years to its endurance, and the abatements of rent given and other acts of kindness which have been, by the venerable marquis and his noble lady, conferred upon him, in common with the other tenantry of the estate.

He will not tire the reader with a detail of the numerous little experiments which have led him, step by step, to his present system of management—a system containing many imperfections to be discovered, possibly, and corrected, and in no way so likely as by the comparison of the details of his management with those of other and better-informed farmers, who may be induced, like him, to communicate their stock of ideas to this society, for the purpose of being added to the general fund collected by them, for the use of the profession.

Management.—The first outline of his management is this: he breeds and rears his flocks in Strathnaver, devoting Morvich and its adjoining pasturage grounds as a refuge for the weak end of his ewe stock, and for the purpose of preparing his sale ewes for market; Culmaily being used as the refuge for the weak end of his wether stock, and for preparing his sale lot of wethers for market. At Morvich, too, he keeps under his own eye the *élite* of his ewe stock, from which his tups are bred, and at Culmaily his tups, which are marched off to the ewe flocks in Strathnaver at the appointed time.

In going more into detail, he shall divide what he has to say into two parts—the first concerns his tillage, the second the management of his flocks.

1. *Tillage*.—His tillage land is subdivided into twenty-one inclosures, the fences of which are dikes or stone walls, all built by the tenant*, viz. sixteen at Culmaily, and five at Morvich. The sixteen at Culmaily are wrought in three-shifts, viz., six fields of the lightest quality in the course are under the rotation of—first, turnips; second barley; three, four, five, grass; six oats; ten fields, or two fives, are thus cropped—first, turnips; second, barley; three, four, grass; five wheat; the five inclosures at Morvich in this course—first, rape or cole and naked fallow; second, wheat, three, four grass; five, oats. He grows no more potatoes than are necessary for the subsistence of the people employed, and these are grown among his green crops in alternate stripes of six drills of each kind.

On each of the two above-mentioned divisions of the tillage farm there is a suitable onstead of farm buildings, and a powerful thrashing mill impelled by water. On Culmaily are meal and barley mills of small size, also impelled by water, for the manufacture of his corn.

His whole tillage, as well as the transport of his wool and materials necessary for the stock land, is performed by six pairs of horses†, a grieve or bailiff, six ploughmen, and a spademan; a second grieve or bailiff to superintend the women, employed on the farm, a millwright, and sixteen women for the two thrashing mills. In summer these sixteen women, with fourteen to twenty boys and girls, according to circumstances, in addition, clean the green crops; and in harvest ten to eleven bandwin or from sixty to sixty-six reapers, with ten to eleven binders, under the superintendence of the second bailiff, cut down, bind and stock the crop. The grieve has at command a hardy highland pony; and the farmer, who resides at Morvich, two riding horses, to one of which can be yoked a light gig, for his conveyance to distant parts of the farm.

He will proceed to describe, as briefly as possible, first, the habits of his people and the practices used in his tillage farm; and secondly, the particular detail of his tillage applied to each species of crop grown.

The grieve or bailiff and four of the ploughmen are married men. Each of these families possesses, during the year, a house and garden, a milch cow, at all times well fed, thirteen Scots bolls or 16½ cwt. of oatmeal, three Scotch bolls or about three cart loads of potatoes, a limited quantity of English coals, of the best quality, and a money wage. That of the grieve varies with circumstances. The money wages of the ploughmen may average about ten pounds each. For the above allowance each family keeps a young man within the house, and, if any circumstance put two young men to lodge with one of the families, there is allowed 6½ bolls of oatmeal, one boll of potatoes, fifty-two shillings per annum, and some coals, for the additional lodger. When the force comes

* An allowance, or 'meliorations,' to be paid by the landlord to the tenant for certain improvements, at the end of the term, is stipulated for in the lease.

† Seven pairs, including one pair of mares in foal, and one pair of young horses thrown off to grass during summer.

to Morvich the men are fed in family with the shepherds there, and 17½ pounds of meal per week are deducted from each man during the time he is so maintained.

Various plans have been tried on the farm; but for several years the above-described method has been adhered to as that which, on the whole, has wrought best. The young men were found to be made more steady by the society of the married family, and the married servant went with a better spirit through the *unremitting labor* attendant on his lot, when he saw his family admitted to as much comfort as could, in these bad times, be afforded; and the prospect before him of assistance from each of his children, as soon as they could gather a weed or hoe a turnip.

There are eight additional families on the skirts of the tillage farm; each of whom at a nominal rent possesses a house and garden, a cow's grass, and a patch of ground, and who, when required, work on day's wages; the younger children at fourpence, girls at sixpence, old men and lads at one shilling, and able men at one shilling and sixpence per day of ten hours. Their cows are not well fed; they give no milk in winter; but each family has a trifle of bear or bigg* in a small stack behind his house, from each two pecks (three pecks imperial) of which his wife could brew sixty quarts of small beer for her family, were she not prevented by the fifty penalties of the cruel and impolitic malt laws.

In the latitude of Sutherland there is a great diversity in the length of the day and night, at different seasons of the year. From the middle of November to the 1st of February there is no light to perform field work before eight o'clock in the morning, or after four o'clock at night. The practice at this season is, for the families to start at a little past six, and light their lamps. By the light of these, while the women prepare breakfast, the men clean their horses, water them, put the harness on them, one feed of corn† for each horse into the manger, and another into the mouth bags. At dawn they draw out and begin a yoking or journey, which, with an interval of twenty minutes to empty the mouth bags, lasts until dark. They then return, water their horses and wash their feet, unharness and dress them; fill the rack with oat straw, and the manger with well-washed yellow turnips, on which the horses amuse themselves until eight o'clock. The men in the mean time dine, and at eight a bell is rung, the lamps lighted, the horses thoroughly dressed, the racks again replenished with fodder, and the manger cleaned out and filled with a mash, made by one of the ploughmen during the evening of the preceding day, consisting of one feed of light corn for each horse, boiled up or rather stewed with yellow turnips cut down, bran from the meal mill and chaff. This closes the duty of the day; the men sup, go to bed, and sleep soundly until six o'clock again rouses them to their work.

In February, the day lengthens out, and the yoking lengthens with it until it extends to two journeys of five hours each; at which time the horses begin to be fed with hay in place of straw. The lengthening day now gives an interval for dinner at mid-day, which increases, by the 20th of May, to three hours; and this interval is permitted

* A species of barley.

† One peck and one gallon imperial, make four Scotch lippies or feeds.

to them for dinner and rest. They dine at eleven; and most frequently sleep behind their horses from twelve to nearly two o'clock, when they begin their second yoking of five hours. By nine o'clock they are all in bed.

At this time the green crop seed-time begins, and with it the two journeys increase to eleven, and sometimes twelve hours, the horses getting three feeds each per day. The people, at this time, start, feed, and breakfast at four, yoke at five, rest at eleven, when they dine, and rest till two. At this hour they begin the second journey, which lasts until seven, half past seven, or eight, according to circumstances. These seeds are all got in before the 1st of July. The horses are then put to grass: young horses allowed to amuse themselves for the season, and the remaining five pairs restricted to two feeds of corn and ten hours' work, until the cold nights of autumn bring them back to the comforts of their stable; and the short day of November to the arrangement which was followed in that month of the previous year.

The yearly expense of one man and pair, fed and wrought according to the above method, is 80*l*. For the whole six hundred and fifty acres, and other cartage, six pairs, being at the rate of one hundred and eight and a half imperial, or about eighty-six old Scotch acres per pair. The griever never leaves these teams: he sees them dressed and led, and he sees them wrought; and the master's eye follows him in every step. The fields are ploughed in regular divisions, the strength concentrated almost perpetually to one object in one field, and the carriage performed to time, by regular yokings; and the writer does not think, that a much better extent of work could be performed, at the same expense, with justice to the men and cattle. At the same time he is aware of imperfections; and if better farmers will give a minute detail of their mode of working, he will gladly borrow from their better judgment.

Piece or task work, except in small detached jobs, has not yet found its way much into tillage work in Sutherland. To greater exertions than time-work it certainly leads, and to greater irregularities than is admissible in a well-regulated system; but it saves the trouble of superintendence.

The duty of the second griever is to attend the thrashings that are performed by the millwright and eight women at each onstead; to watch over the cure of one hundred and sixty wintering cattle under the superintendence of three lads; to hand weed the fallow breaks, and to hoe better than one hundred and twenty acres of rape and turnips; and with ten or eleven bandwin or bands of reapers to cut, bind, and stack the crops.

In thrashing, the first rope of thatch is loosened, and the sluice drawn at eight o'clock: one of the women, with a boy and horse, carts in the corn; the miller feeds; the seven girls attend, each her particular part of the machinery; and by four o'clock, the folder of two ten quarter stacks is thoroughly separated from the corn, and strewed for the cattle, the corn separated from the chaff, and measured over by the second griever and miller to the granary-keeper; and this person's receipt for the quantity in the master's pocket. The expense may be as follows:

Millwright, two-thirds of a day	£.	s.	d.
Second griever	0	1	8
	0	1	0

Eight women, say eight hours, 64—say 6½ days	0	8	8
One lad and cart	0	8	0

Say 5½*d*. per quarter - 0 8 11

This, for oats, barley, and wheat, may cost sevenpence to eightpence per quarter.

No other general remark occurs, except on the subject of manure. On Culmally-farm there is a very considerable supply of sea-ware, of very excellent quality; on Morvich, which is more inland, there is great abundance of fern or brekan (filices), which grows luxuriantly on the soil composed of the debris of the felspar rock, and yields potash. It is the practice to mix the sea-weed with the court-dung, in alternate strata. The dunghills so formed being hard trampled down by the carts and the feet of cattle, the mass is found in the beginning of May to be strongly saturated with an infusion of the muriate of soda. It is turned over and slightly covered with mould, for fermentation, preparatory to its being applied to the soil, and it forms a manure of the very first quality. The ferns are cut green, brought together into a great stack, where they ferment to a considerable degree; they are subsequently trampled down under the sheep's feet at sortings, smearing, and at shearing time; and being mixed and further fermented in the mass with court or fold dung, they are therewith applied to the naked fallows about to be sown with wheat.

The first and most important part of the rotation employed, is the growth of the green crop, that is cole and turnips; for they are managed in precisely the same manner. This species of crop is most important in two respects; first, as the pharmacopœia for the whole stock on the farm, and secondly as the key-stone of the system of tillage farming employed—and that on which the quantity and quality of each succeeding crop of the rotation depends.

Green crop.—The green crop, of course, succeeds a culmiferous or corn crop. The first operation is the furrow, in the direction of the former ridges, given immediately after harvest and the conclusion of the wheat seed: the ground is cast into breaks fifteen yards broad, and the ploughing so deep as to leave some of the lime visible below the plough sole. When this work has been completed, the field is neatly water-furrowed, and left to receive the fertilizing effects of winter.

On fields of light soil, when the crop is intended to be sown on bonedust, the gates remain shut until after the conclusion of the oat-seed in March. On loams of heavier quality, where dung is to be employed, four dunghills are founded on the head-ridge, two at each end of the field. The foundation is composed of virgin mould or ditch scourings, two feet deep; over this are placed, in alternate strata, four layers of fold dung, and four of sea-weed; and the mass, when completed, is neatly spaded up, covered on the sides and top with mould, and the field shut up to wait further progress at a more advanced period.

When the oat-seed has been completed, the gates are opened, the water-furrows shut by the plough, the field thoroughly harrowed and hand weeded, cross ploughed in wide breaks, and again harrowed to perfection, and every weed gathered into heaps, burned, and the ashes spread. This done and the dunghills being at the same time

turned for fermentation, the gates are again shut, until the completion of the barley-seed, when the tillage is renewed in one of two ways. If a very light field, it is again severely harrowed by cattle travelling at a quick pace, and hand picked, &c.: if a field of better staple, it undergoes a third ploughing across the former one, a rolling, harrowing, and hand picking; and in both cases it is left in a highly-pulverized state to wait until seed time. When the people open the gates to begin sowing, they like to find a young and scarcely perceptible brood or growth of annual weeds thinly scattered on the surface.

At the time of sowing green crops in Sutherland the dusk or twilight of the evening glides into that of the morning, without passing into night; when the sun has a most powerful influence. The seed process is, therefore, carried through with every possible despatch. The method followed is twofold: in each case it is preceded by a deep furrow-line, to define the head-ridge on each of the four sides of the field.

1. Where dung is to be employed, two ploughs, which are yoked twenty minutes before the carters, open drills, furrowing an acute angle with the side ridges; to favor the admixture of the dung next season in the mass of the field, these furrows are from twenty-seven to thirty inches wide, according to the quality of the soil. Four single carts follow, two at each end of the drills at the rate of fifteen to twenty tons per acre. Six girls spread the dung as fast as the carters deposit it. Two ploughs, which yoke forty minutes later than the carters, cover in the dung. A few boys and girls hand-pick the whole. The sowing machine follows and rolls in the seed; and at the termination of each yoking, three acres, which at the beginning lay flat and damp from the former tillage, is drilled, dunged, covered, hand-picked, sown and completed. The machine sows two drills at once. Its rollers are formed to encompass and embrace each drill. The two sets of rollers (one for each drill) are separate, and diverge on an iron axle in such a manner, that they can be made to deposit the seed only on the top of the drill, immediately incumbent on the manure—a condition which insures a more equal and a better crop than where less perfect tillage is employed.

2. When bone-dust is used, fourteen quarters of the manure is wet and covered for fermentation forty-eight hours before the yoking begins. The horses cart this to the field at yoking time, and the loads are set down at measured distances in different parts of the field. Two ploughs open the drills; ten boys and girls manure, carry, and sow the dust into the drill, which is in a state of incipient fermentation. Four ploughs instantly cover in. The sowing machine follows, and from four and a half to five acres are completed at a yoking. The machine is regulated to sow from one to four pounds of seed per acre, according to the farmer's intention. The quantity sown is generally about two pounds to the imperial acre. In all cases the seeds are floated, the lights are skimmed off, and the good seeds dried with flour of sulphur, all at the time of sowing. The sulphur is thought to preserve the seed from vermin. The dampness, however, communicated by the floating to the seed, and the fermentation incipient in the manure, does, with greater certainty, at that sunny season, send up a regular vigorous braid, and carry it quickly to

the rough leaf, at which state it is secure from the fly.

Some farmers use bone-dust sowing machines drawn by two horses. The writer of this report, on the whole, prefers manual labor, performed after the fashion above described, to any sowing machine which he has yet seen.

Besides rape or cole he grows four different kinds of turnips. At the part nearest to the mountain (intended to be first used by the sheep) white globe; in the middle, red top and green mixed, four drills and four drills alternately; at the bottom, for spring eatage, yellow, one-fourth part may be white globe, two-fourths, or rather better, red and green, and the remainder, where the field suits, yellow. The white, for early eatage in November and December, and for quantity per acre, are unequalled, but their thin skin renders them too tender for the frosts of January and February. The red and green, with great bulk, are proof against the severities of winter. The writer of this report mixes them agreeably to that law of nature which gives *none* of its eatage in one single species; and he thinks the sheep like the variety which is in the two sorts mixed. The yellows, as they retain their sap longest, are decidedly the best for the spring months. The different sorts are made to follow each other in the same drill, by using different seed-boxes, which are exchanged at the different parts marked in the field; the removed one being laid down on the top of the nearest two drills to wait the return of the machine.

The Scotch farmer will pardon this minute detail of his every day work, which is submitted to the English reader in case he should choose to give a fair trial to the *drill* husbandry in the cultivation of turnips.

The writer invariably grows his own turnip seeds. He plants his four different lots of roots far distant from each other, to prevent hybrid admixture, having first selected the roots with great care from the field in which they had been sown. Where, in the course of his little tours, or by correspondence, he can pick up small samples of what is called good seed, he sows them, marks the drill in his weekly report, and pricks from them in the ensuing month of November whatever may seem likely to give a good cross in his seed plots, one load to ten of his own sort, perhaps; less or more as he may judge advisable at the time: it is a measure to be adopted with great caution. Some samples which he obtained from Aikeld and Kelham, in Northumberland, from Samuston, Roxburghshire, from Leaming Lane, in Yorkshire, and from Dalswinton, in Dumfriesshire, have done him a deal of good; other samples obtained from gardeners and nurserymen have turned out to be trash in some cases, and in others to be of the very best breeds.

But to return to the tillage: the green crop sowing begins with the rape, as formerly mentioned, about the 25th of May; it concludes before the last week in June. Two horse hoe harrows, followed by twenty or thirty hand hoes, attended by the second grieve, are then set on, first to the rape, and so forward through the turnips, to the latest sown crops. By the time the latest sown is completed, the first sown is ready for the second hoeing. The horse hoes then exchange their harrows for small double mould-board ploughs: with these they set up the crop lightly, and thus,

about the middle of August, concludes the tillage. In some cases, however, a second, and more effectual setting up takes place in the month of December, of that part of the crop intended for latest use, after the first frosts have made it plain that no further increase of crop is to be expected.

By the above process the ground is left without the vestige of a weed, and the crop does, generally, in every case, completely cover the soil. The Culmally turnips have, this season, been tried by pulling and weighing measured spaces, as fairly as possible, over different parts of the field, and the following are the results:

	Fold Manure	Bone Dust	Average.
White globe per imperial acre	T. 30 82	T. 35 23	T. 27 15 2½
ditto	18 5 1	33 17 0	25 1 0½
Green Top	18 1 0	31 10 1	24 15 2½
Field yellow	0 0 0	25 12 3	

This was not a fair experiment betwixt bone manure and fold dung mixed with decomposed sea-weed, since that sown with dust was much the best field of the two. But it shows clearly the proportions which the different sorts of turnips bear to each other, and the causes why, for keeping stock, the writer prefers to have his greatest quantity of the coarser and more common sorts. Of Swedes and mangel-wurzel, he has, for many years, grown none. Whether from the nature of the climate or the soil, he could never bring them to a full crop, and as his sheep hospital, in a great measure, breaks up when the cotton grass comes into flower in March, he found no inducement that he could balance against the sacrifice of quantity.

Barley.—When the turnips have been eaten off by sheep, the surface of the field bears some resemblance to a macadamised road. So far as compression goes, it is certainly not much different from lea, when about to be broken up after pasture. It is usual to cross-rib and harrow it before giving the seed furrow. In strong land, indeed, it sometimes gets a previous clean cross furrow; in soft sandy loams a seed furrow on the turnip break is found quite sufficient. No weeds grow among the corn sown up to grass, and it is never drilled, but invariably sown broad cast. The broadest sowing machine, is an invaluable article, although extremely apt to be bent in the rods, and otherwise spoiled, by the rough, and unskilful hands, which use it. The quantity of seed given varies from three to five bushels, according to the quality of the soil. The seed time endures from the 1st of April, to the 1st of May. Early sowing has not been tried; but by what is said on that subject in the Society's report, No. 1, the writer of this paper intends to make the experiment in February, and March first. The returns vary from thirty-nine to fifty bushels of a dark coloured heavy weighing grain, in good favor with distillers.

Grass.—One advantage derived from our late period of sowing is the opportunity afforded of putting in the grass seeds in good time to be covered by the last turn of the harrows, which follow the seed corn; a method affording a better braid and more vigorous plants than when the seeds are rolled in after the barley has got above ground. On soil of the first quality one bushel pacey ryegrass, having a good admixture of rib grass in it, eight pounds white clover, six pounds red, and six pounds trefoil. On soil of the second quality, one bushel and a half ray-grass, eight pounds white, four pounds red, and six pounds trefoil; and

on third quality, two pounds of ray-grass, eight pounds white, six pounds trefoil, are usually given; to which, in very light moor land, he has very successfully substituted for barley half a peck of rape seed. In this last case an inclosure of very worthless land becomes, both in autumn and spring (April), a nursery for the weak part of young stock of first quality.

One inclosure, of best quality, is invariably set aside for hay to the working horses. That it may come early to the swaith, it is never permitted to eat it down in autumn. To save the esculence of the hay and the fertility of the field, it is cut the instant the ray-grass comes into flower (excepting what is required for next year's ray-grass seed,) and an exertion is made to get the hay carried before the 8th or 10th of July.

1st. That the aftermath may be, at shearing* time, open to recruit the weakest and worst fed lambs; and 2dly, that the hay making may be put past, after the cleaning of the rape, and before the succession of turnips sown, press, for hoeing, on the hay-makers. The young people employed on these works are sure to quit the farmer by the 1st of August, to employ themselves in the herring fishery; and the farmer, whose summer hand work is not, by that time, completed, has a very poor chance, for that season, to bring his green crops to a successful termination.

Besides this field appropriated for hay, the rotation gives six inclosures at Culmally, and two at Morvich for pasture. The two at Morvich are devoted as a summer nursery for the ewe stock; one at Culmally as summer nursery for the wether stock; one for the work horses, colts, and servants' cows; and the remaining four prepare the sale cattle for market. The fields at Morvich not being eaten bare by the sheep, the scythe is passed over them as soon as the lambs have been sheared, and the ewes sent to the heather: the grass cut, made into hay, and carted off as speedily as possible, that a short close bite may in good time succeed for the further progress of the stock.

The cattle alluded to are all bought in from the people who are settled round the shores of Sutherland, in small lots of land, for the prosecution of the herring fishing. These people have one, two, or three cows each. They sell the calves at from nine months to a year old. The tillage farmers buy them, and prepare them to travel south. The writer of this report uses nearly from seven to eight scores. He buys them in April, puts them, during summer, on his *superabundance* of deer hair, transfers them from that in August to certain coarse rushy loams, where coarse grass grows, brings them to his courtyards at Morvich and Culmally to eat straw in winter, and finishes them off for the road during next summer in the inclosures above mentioned. With some little assistance from the field appropriated to the horses, the four fields summer, on an average, with attention, at the rate of 1½ per acre. It is the practice to fill up two fields with three cattle per acre, and to shift once a fortnight.

The breed is the Norland Kyloe crossed, in some cases, with the Argyleshire breed, of which the noble marquis has long kept a selected breed at Dunrobin. I am of opinion that had proper skill and attention been used to infuse the Argyle-

* Weaning.

shire blood into the Norland breed of the country during the last thirty years, during which his lordship has possessed the means of doing so from Dunrobin, they would, at this date, have doubled the value of the cattle export of the county of Sutherland. Assuredly the farmers could afford to the people for their yearlings twice the price now paid were they bred in a different manner; and this remark is peculiarly applicable to the north coast, where a great mixture of worthless Caithness blood prevails.

The sales for the southern market happen in July, August, and September, and they clear the fields in order to prepare them for sowing wheat.

Wheat.—Until bone-dust manure came into use, this mode of cultivation could not be advantageously followed; and it is doubtful whether oats may not, by-and-by, be found, after lea, the best crop of the two. In the mean time no farmer can refuse the premium offered by the cornlaws, of 60s. for wheat, in preference to 24s. for oats.

The first operation is, to spread the dung saved from the green crop on the leas. On strong lands a cross rib or break furrow is usually given a few weeks before the seed furrow. To prevent the seed from being deposited too deeply in the soil, it is usual to give one stroke of the harrows before the sower. The seed being steeped in the field among stale urine, lights are skimmed off, and the good corn is instantly dried with hot lime and sown, and no smut has hitherto followed. On light sharp loam, and on the rape land previously eaten down by the small sheep it is sown upon one furrow; and in all cases the field is directly and effectually water-furrowed, and shut up for winter.

The produce varies from twenty, to forty bushels per acre. The species sown is the thin chaffed *Kessex*; in some cases the *Talavera*. The quality produced is coarse, and generally ground down for ship biscuit. A few additional plantations and greater skill may improve the quality in a degree. Still wheat is not naturally fit for the country or the climate.

Oats.—On the lightest soil in Culmally the author sows Angus oats after one furrow in spring; on the whole leas at Morvich, potato oats after the same degree of cultivation. The Angus oats are generally consumed in horse food, the other in meal, for the use of from thirty to forty families employed on the farm.

The oat straw is given to the horses in winter, and to the Kyloes at that time when the catage has got bare, and the turnips cannot be spared from the young stock, which wait, at Culmally, for the return of the flower of the cotton grass.

Sheep.—But, most assuredly in such a country as nine-tenths of the county of Sutherland is, sheep are at present the only animals fitted for converting the vegetation into realizable value; and without free use of that part of the country fitted by nature for affording to the flocks refuge from the wintry storms of the gneiss-district of mountain lands, that value cannot be brought out. On some ill laid out farms, not one half, and others not much above one-third of the lambs bred, come to be sold as grown sheep; and the survivors, when sold, are of inferior quality, and bring a very poor price.

The plan followed by the writer of this report to save these losses, and to make his sheep worthy a better price, he will frankly lay before the reader,

after premising, first, his consciousness of many imperfections in it, and secondly, that what suits his particular position may very possibly be unadapted to any other farm; and most assuredly it is so, according as the nature of the ground, the climate, the extent, or the position of each particular farm, with respect to markets, varies from another.

The sheep reared by the reporter, is the Cheviot, which is one of the many varieties into which the *ovis aries anglica* has, during the lapse of ages, multiplied in consequence of the differences in climate, food, and treatment, to which it has been subjected. The Cheviot hills are, perhaps, the steepest and the highest ground in England to which this species of sheep has been naturalized; and it is quite comprehensible for a store farmer to understand how nature, seconded by the wishes of the shepherd, should have gradually changed the forms of any of the low country varieties, to the light fore-ended, short and close woolled animal which is found among the border mountains. In fact, one can scarcely treat on the pasture of the Cheviot and survey the plains below, without seeing, that as often as the ancient borderer brought to his mountains the varieties of stock found in the neighboring vales, the scanty spring food, the elastic air, and other peculiar features of this new country, belovied to fashion the survivors of the lambs there bred, and even if young, the ewes that suckled them, to the small-neck, light fore-end, fine short stunted wool and other properties of the old Cheviot breed.

The Messrs. Robsons, of Belford, Samuston, and Philogar, in Roxburghshire (from whose stock a great portion of the reporter's sheep have been bred), informed him that, about the year 1770 that family imported from Lincoln, Gloucester, or Hereford, several sheep, a slight infusion of the blood of which into their flocks was attended by the best effects. Betwixt that time and the year 1790 the discovery of the use of green crops and various other improvements had been made, and must have greatly forwarded the views of the spirited and intelligent border farmers of those days. From the year 1790 to the year 1800 the weight of the Cheviot fleece is quoted at 2½ to 3½ lbs., and the quarter of mutton 12 to 18 lbs. At this day (1830) the weight of the reporter's sheep bred in Sutherland may be—fleece 4 to 4½ lbs.; quarter from 18 to 26 lbs. avoirdupois. Certainly in strength of withers, fulness and breadth of chest, strength of loins, length, breadth, and cleaving of the rump, depth of twist, and furnishings of the arms and thighs, most likely, too, in constitution and propensity to feed, the Cheviot sheep of this day exceed that which went before them.

The reporter's sale sheep are marked as in the foot-note*. They have generally been fed for the Leeds, Manchester, and Liverpool markets (though some of the ewes have been, and are now, feeding

* Each sheep has the letter C branded or burned in the far cheek, and an S imprinted with tar on the near rib.

Each wether has a fore bit and hole cut with an iron out of the far ear.

Each ewe has four bits in the one ear and a fork in the top of the opposite one.

Some of his admirers have been known to go to market with the S, but they have not yet ventured to assume the other marks.

much further south); and it may happen, that some reader of this report may have seen, and will know them, by the marks now given.

When he determined to put his pasture land under Cheviot sheep, he resolved thoroughly to drain the surface of it in the manner then done on the eastern borders, and to put his flocks under the superintendence of border shepherds. They were chiefly young men, who married and brought north their sweethearts with them. He settled them in cottages on suitable parts of the farm; giving to each, where the situation admitted of it a young man to board with them, in the manner agreed on with his tillage servants. The shepherds' wages, however, much exceed those given to ploughmen. If a shepherd does his duty, he must exercise a deal of consideration, and undergo much hardship; to which the man whose sleep is soundest in the wildest storm, and whose meat is regularly placed before him daily at certain hours, is not subjected. The householder is afforded a cottage and garden, thirteen bolls of meal, grass for three cows and one pony, with the profit to be derived from seventy Cheviot sheep of the different sorts each, mixed among the master's sheep of the same kind. The young men get board and lodging in the householder's family, and the profit derived from sixty sheep. The reporter employing eleven married shepherds and eight young men, this gives the number of twelve hundred and fifty shepherds' sheep or packs mingled among the master's flocks and spread over the farm;* and thus, something very like a partnership concern tacitly exists between master and servant; for although the management rests entirely with the master and his managing shepherd, yet is every shepherd, old and young, deeply interested in the skill, prudence, and vigor employed; and that master will prosper badly who does not hear, and patiently inquire into, all that every shepherd has to say, concerning each and every part of the management; taking due care as he goes on, as much as possible, to identify the interest of each with that of the whole community.

Before explaining his particular mode of working the stock of this farm with Morvich and Culmailly the reporter must mention one or two particulars appertaining to the farm, which had weight with him in deciding on that management. In the first place there turned out to be no one herding on it, where in the ordinary mode of laying on and tending lambs or hogs, they could be kept, without an enormous loss, by an inflammatory disease of the stomach, called 'sickness,' or 'braxy.' They were tried in separate herdings, and they were tried following their mothers throughout the year; but with such bad success, that the loss seldom fell short of fifteen per cent., and varied betwixt that and thirty. Secondly, several of the herdings, which were in a greater degree incumbent on mica slate, with little variety of fine grass on them were found subject to a disease called pining—a general wasting of the body, and prostration of the

strength of the animal, followed, if not cured, by death. And lastly, the skins brought in were found to consist, in a great degree, of those of the youngest and worst-fed lambs, which fell at every age by pining or drowning, or both, after having gone through the ordeal of the braxy.

Four remedies for these evils were devised, and with some success. First, for the pining, it occurred that the immediate removal of the patient from its former 'haill' or herding, to felspar land, and from that, if necessary, to the sandstone land at Culmailly, might be efficacious. It was tried, and with such good effect, that, when taken in time, the felspar land alone answered the purpose. In other cases they were obliged to be sent down to Culmailly. Secondly—The wedder lambs, five hours of rape and turnips, with nineteen hours of heather, per day and night, effectually saved. Thirdly—As it had been discovered that, after several years' depasture of certain herdings by old sheep, lambs might, for one year, be trusted on them, if well herded; therefore, in order to save the ewe lambs, the farm was thrown into the following courses—Nos. 1, 7, 4, of Strathnaver and Morvich were called four-ewe and ewe-hog herdings, of which three kept ewe flocks, and the fourth ewe hogs, after it had been three years bitten by grown sheep, and Nos. 2, 6, 9, were wedder herdings, one of which was under ewe hogs, after having been two years bitten by grown sheep. Lastly to save the young lambs, the lambing was made as early as the climate permitted. The speaning was performed nearly a fortnight sooner than had been formerly practised, and the youngest and poorest lambs were sent at once to the best and most successful pasture, the more quickly to advance them to maturity.

By a vigilant attention to those measures the losses on the farm were reduced nearly one half, and the stock of every age exhibited a greater degree of health, and the sale lot more equality than the reporter or his people had in other circumstances seen.

To stimulate the shepherds to individual exertion, the reporter is in the practice of throwing out little premiums for competition among them, and he believes they do exert themselves very fairly. Nevertheless, there remains seven to eight per cent. annual loss on sheep lambled on the farm, and from ten to fifteen per cent. deficiency on what, from the number of ewes put to the tup, ought to be lambled against which he has not yet prevailed. Younger men will be found hereafter, who, possessed of greater science to arrange and skill to execute, will point out the errors of this day, as the present stock farmers smile at the folly of those who went before them, and who were content with the trifle which they realized from the cattle and Highland ponies that waded through the undrained bog and trampled it into mire.

In going more into detail of his management, he will first exhibit the manner in which his flocks now possess his farm, and then, beginning with the lamb when unkhied at speaning time, he will show how each sort of sheep is with him treated from that time until it go to market.

In this year (1830, 1831) Nos. 1, 7, 8, and 4 are under ewes: Morvich and the north side of No. 2 in ewe hogs; Culmailly in wedder hogs, 3 and part of 9 in yill gimmers.* South side of 2

* The packs have marks totally different from the flock, and their faces have no brand or burn mark. The master keeps the shepherds' accounts, and balances them by double entry: if he do his duty, deception cannot take place. So many checks arise out of the system that he would quickly discover any thing wrong. They are a well-paid, and generally, almost universally, an honest, trustworthy class of people.

* Ewe hogs once shorn.

and 6 in dinmants,* and 5 and part of 9 in wedders; Morvich at the same time keeping the small end of the sale ewes and the ewes selected for breeding tups; Culmailly the small end of the sale wethers and the tup himself, and reserve being kept as follow:—In Culmailly for any wether sheep diseased; Morvich for ewe sheep diseased; the felspar land of No. 2 for sheep pined on the west side of the Naver, and that of No. 6 for sheep pined on the east side of that river. When the cotton-grass flowers in March, the following shifts will take place:—Morvich ewe hogs give place to the sale ewe lot from 7 and part of 8, which are then brought in to lamb, and consequently, to spean early, and prepare themselves to travel south. The wether hogs in Culmailly give place to a limited number of the small end of the sale wethers, which make greater progress there than on the mountain land, and thus prepare themselves for their further destination.

Speaning.—Then to begin with the lambs. At speaning (weaning) time, which happens in the sale ewe herself about the 11th, and in the keeping flocks about the 18th of July, the lambs are found with the marks which had been put upon them at cutting time in April and May, and which consist of the ear marks of the owners and the figure or 'buiet mark' of the herself. This figure on the pack sheep was reverted on the shoulder to facilitate after sortings.

The operation begins by gathering the flocks shedding off yell sheep (or those which have no lambs), and telling the numbers on hand. This generally occupies a day. The yell sheep being despatched to their proper places the ewes and lambs are committed to their ewe herds who watch them during the short nights of this season. By daylight next morning, the flock is folded; by seven, the lambs are separated from their mothers; the mothers sent off under their own shepherds to the barren ground where their milk is to be dried up, and the lambs left in three folds. The first contains wedder lambs, the second ewe lambs and the third packs. At this stage the men generally breakfast in the fold; immediately after which the wedder lambs are divided into three sorts called tups, mids, and paleys. The tups are branded with a hot iron, buisted with a distinguishing tar mark, and, under charge of the second wedder hog herd, despatched to a tract of coarse pasture along the banks of numerous little burns (on 5 and 6) which fall into Loch Laygal, there to be tended until the middle of September. The mids are in like manner branded and buisted, delivered to the third wedder hog herd, to be summered, until the middle of August, on No. 2, where several little burns fall into Badanloch; and the paleys (young weak and stunted lambs) are, under the charge of one of the principal men, sent directly to the hay-fog or aftermath, and other succulent food prepared for them at Culmailly. The ewe lambs are then sorted into three lots:—First, the paleys are chosen, branded, buisted and despatched straightway to the hay-fog prepared for them on Morvich. Secondly, the worst-bred lambs are despatched to the outskirts of the wedder herding, intended to be in that year shifted to hogs. And, thirdly, the tops (the most choice and best breed) possess the outskirts of the ewe

herding, to be in that year shifted to hogs. The packs, or shepherds' lambs, are divided into two sorts, sellers and keepers: the first, being *heeled* or marked with red chalk, are delivered to the buyers, or put into an inclosure to wait their arrival; the second are divided among the flock lamb herself. This concludes the speaning.

Wedders.—When the small wedder lambs reach Culmailly, generally to the amount of fifteen to twenty scores, they are, after a few days' rest on the sandstone mountain, minutely examined, any lame ones dressed, the weakest portion put into the hay-fog, then about three weeks old, and the rest admitted to the sweetest of the mountain-grass. About the 12th August the sale wedders are delivered, and the mid lambs from No. 2, and the best of the paleys, are admitted to their place. By the 12th September the rape is ready for use: the lambs, then paley, are sent to five hours' rape and nineteen of heather in the day and night. The mids are admitted to the place formerly possessed by the paleys, and the tops from No. 5 and 6 to the former position of the mids. In this posture the lots remain until about the 15th October: the early turnips being now fit for use, nets are set up across the tops of each of three fields, a lot smeared* into each, and five hours' turnips to nineteen of heather† allowed for the rest of the season. With March comes the cotton-grass flower; what turnips remain are then mostly consumed by cattle, and such of the wedder hogs as are fit to face the blast proceed to Strathnaver—the best lot by the first week of March, the next about the third week of March and the worst about the 1st April: one or two scores may be unfit to go sooner than Whitsunday.

It is observed at speaning-time that the paleys consist of two sorts, *viz.*, first, well-bred lambs, which, by reason of being very young, or twins, or badly fed by their mothers, or some other misfortune, are much under size; and, secondly, ill-bred lambs, marked by a *tendency* to short, stubby faces, broad bumpy wiry brows, flat ribs, sharp shoulder-top, round gurning-bones, and twisted legs. When the spring sortings take place, the well-bred mids and paleys are generally found to have advanced themselves to the tops; the ill-bred sheep have as certainly sunk to the bottom, and the last one or two scores which, with equal or superior feeding, lie on hand until Whitsunday, are nearly altogether composed of that sort of stuff.

And here the writer cannot help anticipating an observation, which perhaps would have come in better further on—that the difference in expense of keep, loss by death, and of ultimate profit, in favor of well-bred and against ill-bred stock, is so great and striking on a sheep farm, that the apathy of many stockmasters to the subject is incredible. The reporter and his leading men, year after year, have observed the lamb of a bad ewe a mid or paley—the same lamb unfit to go out in spring—the same beast brought in to make up for sale in its last year—and after all this extra expense, sold as a shott, at twenty per cent. under

* The smearing is an application of salve composed of butter or oil mixed with tar, turpentine, or some other substance, to the root of the wool, for the purposes of killing vermin, protecting from wet, and increasing the softness and the growth of wool.

† There is a waste of manure dropped on the heather land, but no remedy for this is known that is consistent with the health and hardihood of the young stock.

* Wedder hogs once shorn.

the price of the lot, merely on account of the base blood which flowed in its veins.

When the month of June has brought its interminable day, the wedder hogs yield their first fleece. They are then called dinmants; are sent back to the deer hair; and when it falls in August, and the sale wedders have gone south, they are sorted into their wedder herdings, to replace the waygone lot of the last year's ewe hogs; and after two years' stay there, they travel, in their turn, to the feeder.

Ewes.—The ewe lamb follows a course somewhat different from the wedder. At the delivery of the sale sheep, it falls into the finest grass on its herding—the paleys in Morvich—the worst bred full-grown lambs in the wedder herding—and the choice lambs in the ewe herding, made vacant by the cast of the sale sheep. The intention of this arrangement is, that the keeping lambs may, as far as possible, be at once hailed to that herding where they are to be settled as ewes; the deaths, &c. be beaten up from the best bred of the second chosen lambs and paleys; and those least fit for breeding be yelled off for sale—the smallest in the ewe herdings, by being protected by means of a contrivance called “brecks,”* and the largest and strongest by being sent to the herding No. 3, which abounds in those plants best calculated to give increase of bone.

The contrivance of yelling or breeching a certain number of ewes in each herding, besides the advantage it offers in the improvement of the breed, answers an excellent purpose at lambing-time; for the yell ewes being all sorted off the herding a few days before the lambing begins, a greater abundance of feed is left to bring milk on the ewes, and thereby to put layer on their lambs—an article which it becomes the policy of the store-farmer never, if he can, to lose until he quit the sheep to the feeder.

These ewe flocks are tended, as formerly explained, in three double herdings, and one smaller or single herding; and it was also observed, that one of these double herdings is cleared out annually, to receive the choice or keeping ewe lambs. The single herding yields a third of its number annually, and receives from the second lot of ewe hogs its proportion of young stock. By this contrivance, the ewes can be sorted into three kinds: what approaches to tenderness is sorted down to the single herding, No. 8; what is open in the staple, or inclined to be pinny in the fleece, are halft below the double shepherd's house; what is bad skinned, above it. By keeling, or marking with red chalk, the hardiest tups to No. 8, the saddest skinned to the under end, and the loftiest and most open skinned, to the upper end of the double herding, the whole flocks are kept in that medium, betwixt the two extremes, which every store-farmer knows to be essential to good farming, and to the sale of that quality of stock and wool that brings the greatest sum of money out of the market.

Tups.—In treating of the wedders sheep, allusion was made to the necessity of possessing well-bred Cheviot sheep: this, in the writer's very humble opinion, is a condition absolutely required for

the purpose of realizing the greatest possible value from Sutherland mountain ground.

The reporter has seen tups very showy to look at from a distance, and full of wool; but on approaching them more nearly, the observer must have been struck, with how the feet were quite under the carcass, the breast and twist much narrower than to all appearance was compatible with so broad a carcass; with a hollowness or flatness betwixt the eyes, some bristly hairs on the forehead, and very likely an offer to produce a stubby horn; of which the point, like a small nipple, is just discernible where that ornament grows on horned sheep; and, on the whole, the head turns out to be larger than at first sight it was thought to be. Touch him, and you will find a flat neck, narrow hard shoulder, small tail, flat rib, and the back, where the ribs strike out, hard as a deal board; he has very little layer or wool along the back, but (if in condition) exhibits a mass of grease and wool mid-way down the rib; while he will clip at a show from ten to fifteen pounds of wool, of the quality of hemp. This class of sheep is the parent of shotts; his progeny will pay nothing to the breeder, feeder, or butcher, compared with the truly bred Cheviot sheep.

Upon which then these three questions arise—Where is this truly bred Cheviot sheep to be found? How chosen? And how shall his blood be best infused into the flock? These are questions which the reporter will answer with diffidence, being conscious that many breeders are much more capable than himself to answer them satisfactorily. Still the Society having done him the honor to call for his report, he will send his opinion and his practice together, and will feel too happy to have them amended in any particular.

1.—The breed of Cheviot sheep from which he has chosen, and would again choose his stock (were that to do), feed on the Scotch side of the Cheviot hills, and along the tract of high and stony moorland farms which stretches out betwixt that mountain range and the source of the Teviot: on the English side there has been, generally speaking, too much of Dishley blood applied, to have left in the animal the thrift, courage, and constitution necessary for the wastes of the county of Sutherland. West of the Teviot, again, it is within the memory of man since the stock was crossed in, from the *ovis aries rustica*, or black-faced sheep—a cross, of which the first is the best, as is the case in all crosses betwixt animals so entirely different from each other.

The spirited farmers of the western district have, for many years, been importers of tups from the east border; and the circumstance has not, perhaps, in every case, been favorable to the flock from which the importation was made. When this trade began, the west-country breeders fancied sheep with very fine bare heads, flat clean bones, and a short fine fleece, to counteract, as quickly as possible, the opposite qualities of their own flocks. In order to suit the market, the tup-breeders preserved only the finest of their young store. But the west border gentlemen had not gone through many generations, when they found that the cross had been too quick: a reaction followed, and, to the surprise of the tup-sellers, the top was turned to the bottom, the bottom to the top of the fair, and nothing could be sold but tups of coarse quality. The tup-breeders turned with the tide—a few to

* A piece of coarse cloth sowed on across the root of the tail, and about six inches down each hip on either side of the tail.

an extreme degree; many stopped short at the *certos denique fines*, where good management ends: and, certainly, the right stuff, and the most beautiful specimens of well-bred Cheviots, are only to be found in this quarter.

II.—As to the choice of a tup. After Mr. George Culley's description, which is in the hands of every breeder*, it would be presumptuous in the writer of this report to say more on that subject than respectfully to point out the shades of difference betwixt Mr. Culley's picture and the quality thought to be suitable to the county of Sutherland.

1st. His head ought not to be so very fine and small, but the nose should be full and aquiline from the tip (where the orifice is jet black) to the forehead. The brow should be inclined to be long and narrow, covered with short, white†, flat-growing, swirling hair. This cover ought to begin at the tip and extend over the whole head to the back of the crown, close behind the ear, where it is cut off at once by the circle of clean, soft, thick-set, and rather boardy wool, which terminates the fleece.

2d. The junction of the neck to the head must not be so very fine, nor the top of the shoulder too broad, but a rapid increase of strength from the top of the neck to the withers or junction of the shoulders; the top of the shoulder ought to be to the touch, as if the flesh on the chin overtopped the shoulder. This flesh or layer should be deep in quality and well covered with close-set wool, to cover the back broadly and effectually to the cleaving on the tail head, where the spine terminates in a broad tail, set on so low that the eye, in returning along the back, fancies there is a gradual rise from the tail to the neck, and a little swell on the loin.

3d. The skin ought to be by no means thin, and the wool should be thickly planted on it, fine, soft, slightly inclined to be boardy, hanging together in regular staples from root to surface, elastic to the gripe, and covering the belly, and also the quarters as far as the mutton extends; at the

termination of which it is cut off at once by the clean white hair that covers the legs.

The whole animal exhibiting greater strength, daring, and agility, than Mr. Culley's description brings before the mind.

III. In breeding tups, the general practice in the highlands, after selecting the tups thought to be the best, is to shed off from each hirsell of ewes a certain number of what are considered the "truest," and most perfectly formed; to put one tup to each lot so shed off, and set apart; to bid the shepherd tend this lot during the "riding" season separate from the rest of the flock, and from the produce to select tup lambs. It many years ago occurred to the writer, that in this method there were many defects: first, the separation intended was not effectually maintained—during the long moonlight nights of November and December the ewes got back to their accustomed haill, and the tups mingled in the flock;—secondly, it caused a great additional disturbance to the flock, both at riding-time, and at the subsequent lambing, cutting, clipping, and speaning, to say nothing of the loss occasioned by the fox, eagle, cat, martin, raven, &c., all of which could be more cheaply fed in some other way than on tup lambs;—thirdly, in the course of his observation it occurred to him that a great proportion of the ewes so set apart in the several hirsells formed no proper cross to the tup employed in that particular hirsell, but possessed a tendency to the same defects, and to the same perfections possibly with the tups; consequently, the defects on both sides were aggravated, and the very perfections, by increasing to excess, became defects;—and, lastly, as all breeders know that animals in very many cases, and especially where crossing has taken place, breed back not to the immediate parents, but possibly to the great-great-grand-dam or sire; it must follow that, without a particular genealogy of tup and ewe, the object intended to be effected by any particular union will often turn out contrary to the wishes and expectations of the master. It was resolved to make a careful selection from the *élite* of particular families in his own flock; to purchase, at whatever expense, a few of the *élite* of certain ancient and well-bred flocks in the east border; to form them into one "selected hirsell" for the breeding of tups; to place them under his own immediate notice, to study the particular tendency of each family towards a deficiency or excess in each particular "point?" by judicious crosses betwixt the various families to produce stock more perfect than either dam or sire; and through this stock to infuse the best border blood into his flocks. The experiment wrought like a charm, and in a few years it lifted up the reporter's stock to a new position, both at the tup shows, and, what is more to the purpose, in the market where the stock and wool are annually sold.

The most choice lots of the county of Sutherland wool and sheep are generally sold in the "great annual market," held at Inverness, in the second week of July. At this market farmers assemble from all parts of the highlands; they are met by wool-staplers and sheep-buyers from the south of Scotland and from Yorkshire, and transactions to a very great amount take place without show of stock or sample, resting entirely on the character held in the market by the owner and his goods; and it is very seldom that one

* Mr. Culley's description of the ram:—"His head should be fine and small, his nostrils wide and expanded, his eyes prominent and rather bold or daring, ears thin, his collar full from the breast and shoulders, but tapering gradually all the way to where the head and neck join, which should be very fine and graceful, being perfectly free from any coarse leather hanging down; the shoulders broad and full, which must, at the same time, join so easy to the collar forward and chin backward as to leave not the least hollow in either place; the mutton upon his arm or forethigh must come quite to the knee; his legs upright, with a clean, fine bone, being equally clear from superfluous skin and coarse hairy wool from the knee and hough downward; the breast broad and well formed which will keep his forelegs at a proper wideness; his girth, or chest, full and deep, and instead of a hollow behind the shoulders, that part, by some called the fore-flank, should be quite full; the back and loins broad, flat, and strait from the waist; the ribs must rise with a fine circular arch; his belly straight; the quarters long and full, with the mutton quite down to the hough, which should neither stand in nor out; his twist deep, wide, and full, which, with the broad breast, will keep his four legs open and upright; the whole body covered with a thin felt, and that with fine, bright, soft wool.—Culley on Live Stock, p. 108 and 104.

† Many very excellent Cheviot sheep have a gray color on the nose, which gets darker near the tip. Others have a slight tinge of lemon color on the face.

hears of a disappointment occurring to buyer or seller. The market is advertised to take place on Thursday, and the business certainly might be despatched in one day; but gentlemen who find themselves removed for a time from residences which, though comfortable and beautiful, are yet solitary, when congregated with the brethren of their profession, under agreeable circumstances, can seldom be induced to separate before the conclusion of the week. The weekly steamers betwixt Inverness and the Forth and Clyde, and the daily coaches betwixt the same city, Edinburgh, Aberdeen, and Glasgow, afford such facilities, that an English farmer, by embarking at Yarmouth or Sunderland on the east coast, or at Liverpool on the west, might attend this market at the expense of one fortnight's absence from his home.

Accounts.—The farm accounts are kept in the most simple form possible, by journal and ledger, checked by double entry, vouched by the steward's reports and other documents, and abbreviated by five waste-books. The waste-books, consisting of a corn-book, cash-book, sheep-book, time bill-book, and memorandum of statements with work-people, are carried on from week to week throughout the year, and at its termination the whole posted from these through the journal into the ledger, which is shut by a balance account on the 1st January yearly. Farmer's books are not such agreeable companions now, as they were before the battle of Waterloo; nevertheless, a wise man will keep them correctly, and balance them punctually; recollecting that it is in the rout, not the fight, that the carnage takes place, and that that party is safest which shows the most correct front to the enemy. When a farmer's accounts betray confusion or sloth, his servants become indifferent to their duty; faithful servants quit, worse men take their places, and pillage begins. A rogue is shy to engage with a master who pays punctually and liberally, with a professed intention fearlessly to send a thief to justice. He waits for a place of a contrary description, and there he exercises his vocation.

Capital.—According to the best opinion which the reporter can form, the capital necessary to enable a farmer to carry on business in Sutherland may be stated at about four pounds, to four pounds ten shillings per tillage acre, and twenty shillings for each sheep. A Scotch farmer, however, under a decent landlord, may venture farther than would be safe in other circumstances, in consequence of the landlord's right of hypothec, or preference established by Scotch law over the whole produce of the farm in security of his rent. This right of preference exists, tacitly, over each crop for the rent of that crop, and over all stock until three months after the last conventional term of payment. Suppose a tenant's rent payable, by equal portions, at Martinmas 1829, and Whitsuntide 1830, for crop and year 1829. At Martinmas, markets for corn, and, at Whitsuntide, markets for stock, are ruinously bad, in consequence of the glut caused at these seasons by the distress of the English farmer. The Scotch landlord knowing the perfect nature of his security scruples not, in such circumstances, to give his tenant whatever indulgence is necessary for the fair conversion of his produce into money. The difference of five, ten, fifteen, or twenty per cent. on the gross sales of his farm is an important one. Neither is such an ex-

ercise of the landlord's right attended by any bad consequences to society; diminishing, in the first place, the glut of markets at term time, it slackens at another season the gripe of the forestaller, and softens the monopoly which he would otherwise be possessed of; secondly, the dealer who buys farm produce, knowing perfectly the public law of the land, feels himself at liberty, before settling with the tenant, to say, "I presume your rent is paid?" The answer from the most necessitous man is, "Indeed, sir, it is not, but here is a letter from my landlord or his agent, to say that you may pay me 50*l.* on account, and for the balance, he and I will grant a receipt in full." By a judicious exercise of this right of hypothec during the late difficult years, thousands of Scotch farmers have been saved from ruin; and men are now prosperously conducting the operations of a farm who, in other circumstances, must have sunk under the pressure of those times which have overwhelmed so many of their brethren in the south.

Those who disapprove of the right of hypothec say, "Let the tenant find personal security to the landlord, if he cannot pay on term day; or let the landlord at once take an execution for his rent." But it is submitted that it would not be wise to recommend the substitution of an execution for the existence of the landlord's tacit right of hypothec; and with respect to security, where is he to find it, but among persons in circumstances similar to his own, to whom and with whose friends he must join in obligations of the same nature? In the extent and uncertainty of his engagements his head turns, he plunges into one or more of the fatal circles which from three months to three months revolve round the banker's counting-house; and after increasing to the best of his ability, the revenue derived from the "Excise," and thereby proving the "prosperity" of the country, down he comes.

Poor.—Another instance of Scotch feeling the reporter will notice, as it exist among a different class—the cotter or agricultural laborer—that is, with respect to poor-rates. The English, the bravest and most generous people in the world, have established them; and yet it is not said that they are any where so established, unattended by a considerable degree of improvidence and dissipation among the parties in behalf of whom the provision is made.

On the demesnes of which these farms are a portion, with a more dense population than ever existed there at any former period of time*, there are no tithes, no poor-rates, and—no drunkards, or beggars; positively few or none, besides the Irish, and the few squalid, ruined men from the south, who wander occasionally into the country. Nay, one meets with few peasants' sons, of this district, who have not, from such slender wages as this report speaks to, been taught to read, write, and, perhaps, to cast up an account. If a tolerable proficient, away he goes to "seek his fortune;" and the proverb says, "it is a bare moor but he will find a cowe † upon it." Go where he may, his heart is with his father's house; and if he succeeds in life, which he generally does to a certain extent, the "inmates" there are the better for it. The first feeling of a Scotch peasant is affec-

* Vide census, 1811, 1821, 1831.

† Cowe, a bit of heather.

tion for his kindred; the second is his sense of *their mutual* but sole dependence, under Providence, on industry and thrift, to save them from the shame of beggary. The parent wrestles hard to push forward some part of his family by dint of education: the child, unknown to any.

'deposits his sair won penny fee,
To help his parents dear, should they in hardship be.'

By reciprocal good offices, by joint industry, sobriety, and produce, they get on wonderfully. In sickness they apply at the nearest house where any medicine or comfort is likely to be obtained for their friend in distress; they seem to expect it as a debt, or rather a loan, due from one Christian to another: but for the least drop of honey, jelly, wine, or even vinegar obtained there is a visit from the patient, as soon as he can crawl abroad, with a thousand thanks, and a fowl, some eggs, or the like; which how to refuse or to pay for without offence it requires some tact to discover.

On entering the habitation of the cotter, his fare is found to be very simple. In summer, oatmeal porridge with milk for breakfast, potatoes for dinner, and bread and milk or something similar for supper. In winter, porridge, with perhaps a little bit of butter or some treacle, to breakfast; potatoes mashed, cut into slices, and done on the gridiron, and eaten with a very little fish, pork, or a bit of cheese to dinner, and gruel with a few potatoes or a bit of oat or barley bread to supper. His abstinence is nearly complete from tea, coffee, sugar, candles, soap, ale, parliament whisky,* and every taxed commodity, except tobacco; and the nature of the climate has rendered it one of the necessities of his life.

To a greater share of the comforts of life, the agricultural working man and his family may, doubtless, be admitted, and are so daily; but prudence and care and moral conduct continue, and it is hoped will long continue, to characterize this simple, industrious, and virtuous class of men.

PATRICK SELLAR.

Morvich, 6th January, 1831.

A GENERAL DESCRIPTION OF THE APPARATUS FOR CARRYING INTO EFFECT THE FORCING SYSTEM OF VENTILATING COONERIES, INVENTED BY D'ARCTET.

[Several years have passed since we met with some general notices, in a French periodical, of M. D'Arcet's plan of ventilation for coconeries, and of its admirable success in the practice of M. Camille Beauvais, in the very unfavorable climate of the vicinity of Paris. One of these articles was published in a former volume of the Farmers' Register. But still nothing was stated of particulars. We attempted to procure the full plan, as first published, from France; but, like many other such efforts, in vain. At last, it has been obtained for, and published in, the 'Silk Grower,' and we hasten to lay the article before our readers. The successful and interesting results of the earliest

* Within these few years, illicit distillation has almost entirely disappeared, and the character of those that dealt in it has proportionally improved.

experiment on this plan (though very imperfectly executed,) by Messrs. Cheney's, were published in our No. 12, of the last volume.

Highly as we estimate the value of this "artificial system," which subjects, almost entirely, the weather and atmosphere to the control of man, and though we believe it will be found to be the cheaper and better mode in regular establishments on a great scale of operations, yet we by no means recommend it for any other. The natural temperature and ordinary seasons of Virginia are sufficiently good for a high degree of success and profit in silk-culture; and in feeding-rooms of moderate size, where sufficient space and change of air are secured, nothing more than the natural air and temperature is essential, though doubtless a little fire in cool and damp spells would be economical, as well as very beneficial to the vigor of the worms. But though no expensive fixtures or scientific processes and rules are necessary for success, and still less for beginners, it will not be less interesting to know what art and science have done, and can do, in overcoming every natural defect of climate, and source of disease and loss in the feeding insects.—ED. F. R.]

From the American Silk Grower.

[The system of rearing silk-worms, recently matured in France by Beauvais and D'Arcet, shows the devices to which the climate of that country makes it necessary to resort in order to insure success. In publishing the description of it, we think it proper to state that we do not, by any means, consider the whole of the arrangements described, required in our superior climate. A perusal of the details may, however, afford some valuable suggestions to those possessing coconeries or intending to erect them. Silk-worms undoubtedly succeed best when kept at a uniform and pretty high temperature, say about 74° Fahrenheit, and times occur, even in our climate, when the natural heat of the atmosphere, especially of mornings and evenings, falls lower than is desirable. Under these circumstances it is very advantageous to have some convenient mode of diffusing heat through the coconery, for which purpose a furnace and air-chamber may be established in the basement or cellar beneath, either directly in the middle, or at one side or end with flues conducted under the floor, in which apertures may be made at suitable distances to let the warm air into the apartment. This may be effected without recourse to that multitude of holes recommended by D'Arcet, the sizes of which are regulated upon mathematical principles. In an apartment 25 or 30 feet long, eight or ten holes, of moderate size, may suffice. Instead of holes and flues above to lead off the air into a chimney, we would allow the warm air to rise, as it naturally will, into the garret, and then escape through apertures or ventilators in the roof. We prefer coconeries one story high.—ED. AM. SILK GROWER.]

The great profits afforded by the silk culture in the southern provinces of France as well as in other places, had led to repeated attempts to intro-

duce this branch of agriculture into the northern and central departments. These trials were continued through a long succession of years, but generally proved unsuccessful. Recently, however, Camille Beauvais, either from possessing more perseverance than his predecessors, or being more capable of forming a just appreciation of the influences of climate, has succeeded in establishing the culture of the mulberry and the rearing of silk-worms in the vicinity of Paris. The important improvements introduced by him have powerfully contributed to the success of this branch of industry, and are therefore well worth the attention of those interested in the silk culture.

To remedy the defects of climate upon silk-worms, protect them from the ordinary sudden vicissitudes of weather, and place them under atmospheric conditions most favorable to their health and development, were the first objects of his researches. In pursuit of these ends he applied to Claude Dumont, who furnished him with the means of regulating the entrance and escape of air into the cocoonery. Peclat soon afterwards suggested modifications which were of great advantage, and, finally, he had the happiness to find a new assistant in D'Arcet, who, applying science to observation, succeeded in maturing a complete plan of a salubrious cocoonery, by means of which the proper degrees of ventilation, temperature and moisture, necessary to insure successful rearing can always be obtained.

The magnanery, or cocoonery, described by D'Arcet, in which this ingenious system is carried into effect, is at Villemonble near Paris, and was erected by the government architect, Destailleurs, for De Grimaudet. It has two wings, both uniform, and each about 150 feet long by 50 wide. The lower or basement story is appropriated as a

filature or reeling apartment, and place for drying leaves. It has pillars along the centre for the support of the floor above; at one end of this apartment, and through its whole width, a portion is cut off (see fig. 3) serving as a chamber for warm or cool air, and from this the ventilation of the whole cocoonery is effected. The air chamber is supplied with a furnace (4) the flue of which terminates in the main chimney (21.)

It is in this portion of the basement that the heating and cooling, together with the general means of ventilation are effected. The remainder of the story (M) is appropriated to the drying of leaves when these have been gathered in a moist state, and for reeling cocoons according to the method of Gensoul, after the completion of the feeding.

The apartment (O) immediately above the basement is devoted exclusively to the rearing of worms. It has four flues, or conductors, made of wood running under the floor lengthwise, (the commencement of which are seen at plates 1, 2, fig. 14.) Through these the air, after being properly warmed or cooled, in the air chamber, (3) is conducted into the cocoonery. Above these flues are placed the hurdles (8.) The apertures (15) through which the air passes into the cocoonery are of unequal size, each flue has sixty, of which the first that receives the air is only about an inch square, the size of the others increasing in arithmetical proportion as they recede from the air-chamber. The sum of the superficies of the sixty holes, amounts to 0,198 of a square metre, (the square metre being equal to 1,196 square yards.)

The vitiated air of the cocoonery is drawn off by means of four flues (plate 2, figs. 20) placed above, with apertures (19) opening into them. In form and arrangement these flues and apertures correspond with those below for introducing the air.

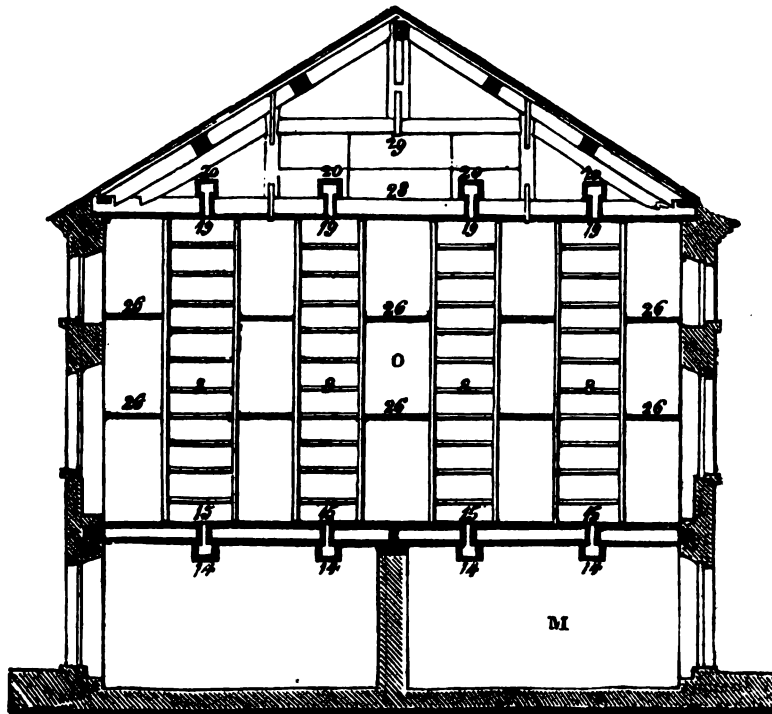
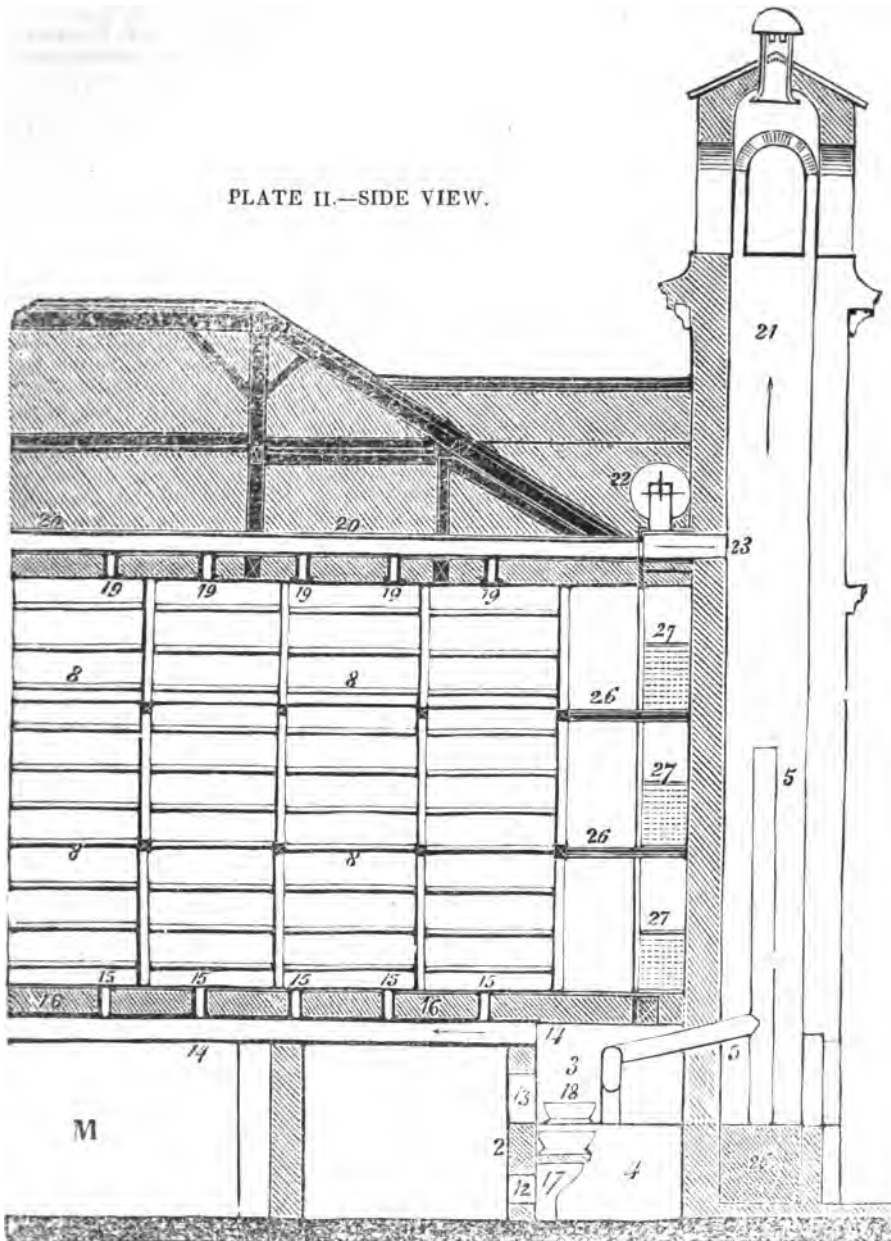


PLATE I.—END VIEW.

PLATE II.—SIDE VIEW.



The upper flues are made to unite into one box, previous to entering the main chimney (21,) this box is furnished with a ventilating wheel, (*tarare*) (22) and its size, as well as that of its opening into the chimney (23,) is five times greater than that of either of the flues.

The air from the cocoonery may be conducted at pleasure either immediately into the main chimney (21) or by way of the ventilating wheel into the garret. By closing the register (23) and thus cutting off the direct communication with the chimney, the ventilating wheel is made to draw the air from the cocoonery and force it outside through

apertures in the garret with greater or less rapidity.

The size of the main ventilating chimney (21) should be equal to double the capacity of the four flues. Ventilating flues may, if necessary, be constructed upon economical principles, the cracks in the wood being closed by means of coarse paper or cloth coated with glue. In constructing a new cocoonery, the flues may be advantageously established in the space between the floor and ceiling.

At the bottom of the main chimney there is a furnace (*fourneau d'appel*) (25) specially appropriated to the purpose of creating and increasing the draught. The pipe (5) from this is

conducted into one leading from the furnace constructed for heating the air-chamber, the draught furnace at the bottom of the chimney, and ventilating wheel above, both operate to the same end, namely, that of always producing the proper degree of ventilation in the cocoonery. In cases where the external air is too warm and it becomes necessary to cool it down by means of ice, or otherwise, before introducing it into the apartment containing the silk-worms, the ventilating wheel may be brought into action.

In his general considerations upon the adoption of this plan for artificial ventilation in cocooneries, D'Arcet observes:—If there be an established principle in Hygiene, it is above all others that which makes the breathing of fresh air necessary for the preservation of good health in animals of every description. Intelligent persons are unanimous in their opinion upon this point. The subject therefore needs no farther discussion in regard to the main principle, and its applicability to cocooneries. The only remaining question is as to the choice of means best calculated to effect the proper ventilation in such establishments.

Upon reading what has been published upon the subject of rearing silk-worms in China, we find that from the earliest periods the Chinese have recognised the necessity of preserving the greatest purity in the air of their cocooneries. We are, however, obliged to acknowledge that the means they adopted for this purpose were very imperfect. To renew the air of a cocoonery by opening to a greater or less extent its windows and doors, shows the infancy of the art. Its effects are to renew the air unequally; to produce sudden changes of temperature with irregular currents, annoying to the worms nearest the openings, and insufficient for those situated farthest from the doors and windows as well as in the corners of the apartment.

The deficiency of scientific knowledge in China, its immense population and the low price of labor in the country, are circumstances which afford an explanation of the imperfection which exists in the means employed for the ventilation of cocooneries, and the success of their rearing. But this success is only to be attained at the expense of time and attention. In France we may and we should do better.

Whilst engaged in applying means for the restoration of health to cocooneries that had been long in use, I ascertained how very rapidly the air became vitiated in those apartments where a large quantity of ammonia formed and accumulated. I therefore saw the great necessity of contriving the means by which a regular and active ventilation might be effected, and the air constantly maintained in a healthy condition. The system of ventilation which I have described in my memoir upon healthy cocooneries, has appeared to me the most convenient for adoption, because it spreads the current of air through the apartment evenly and slowly; it is at the same time simple and economical, easy of application, admitting of every degree of quickness in the current of air, and, when necessary, of an instantaneous check. The plan has been in use for three years, and has perfectly answered my expectations. The extensive correspondence which I have kept up in relation to the subject has afforded the most positive evidences, that the system, even when imperfectly applied, has been productive of the most happy results.

Some persons have thought that the plan of artificial or forced ventilation, such as I have described, must be attended with injurious effects upon the health of silk-worms in consequence of its too great violence. But this charge is wholly contradicted by the experience of three years, during which time, in all that has been said and written upon the subject, not one objection has been made against the too great rapidity of the current of air in the salubrious cocooneries erected according to my plan. On the contrary, I have been questioned, especially by the silk culturists of the south, upon the propriety of increasing the power of the ventilating apparatus, a thing most readily accomplished wherever it may be required; since it is only necessary to raise the height of the main chimney, increase the size and velocity of the ventilating wheel, and employ the means of ventilation with more or less force, according to the atmospheric conditions which may exist.

The forcing system of ventilation applied to cocooneries has for its principal object the withdrawal of vitiated air from apartments, and the gradual substitution of pure air. But its advantages are not limited to preserving the health of the silk-worms and persons employed in the cocoonery.

It is recognized as a principle, the truth of which has been confirmed by actual experience, that it is easier to raise than to cool down the temperature of the ventilating current. In some situations and under certain circumstances, it is necessary to reduce the temperature of the air, in order to effect the most proper ventilation in cocooneries, and obtain the greatest possible product from the rearing. Now the foregoing system of ventilation offers the most convenient means of effecting this object, in the following manner.

When the ventilating current introduced into an apartment is not saturated with watery vapor, it is evident that its temperature will be lowered by coming into contact with wet or moist bodies. When, therefore, it becomes necessary to cool down the temperature of the air, and when this must be done without the use of ice, it may be conveniently effected by sprinkling water in the air chamber, and upon the floor of the cocoonery, or by suspending in this wet cloths. I will not farther dwell upon the employment of these means of which I have said so much in my memoir. But I will observe that silk-worms transpiring freely, and, together with the fresh leaves, being exposed on all sides to a current air, must necessarily have their temperature reduced below that of the surrounding air, a proper regulation of which cannot help being advantageous under the circumstances referred to. As to those persons employed in the cocoonery, and whose natural temperature is fixed above that of the air, the current refreshes them in the same manner that it does out of doors, on which account it will be equally beneficial to them as to the silk-worms. An application of these observations will tend greatly to establish the correctness of the preceding remarks.

Supposing that we had to superintend a rearing in the south of France, and that the air was to get into the calm and sultry condition which they term in those countries *touffe*. In this case if the cocoonery was not well ventilated there would be no means of checking the progress of infection and preventing the death of the silk-worms in the

apartment. If, on the contrary, the rearing was carried on in a cocoonery to which the system of artificial ventilation was properly adapted, the evils might be readily remedied in the following manner:

According to the observations of H. Bourdon, the air which has become *touffe*, has a high temperature, is stagnant and almost saturated with moisture. To restore the air to a healthy condition it is necessary either to remove a portion of the watery vapor which it contains, by lowering the temperature and producing a current, or otherwise by raising the temperature of the apartment a little higher and giving the necessary activity to the ventilation.

In preparing my memoir upon healthy cocooneries I had introduced a chapter describing the means adopted to give the current of air at all times the proper degree of moisture. But the fear of complicating the apparatus beyond what was essentially necessary, induced me to suppress this chapter. In the healthy cocooneries at present established, there are, therefore, no contrivances introduced for directly removing any excess of moisture from the circulating air. On the other hand, as neither the use of ice or the evaporation of water has been generally adopted, the means left for reducing the temperature of the current of air, are extremely inefficient. Under existing circumstances, it is therefore necessary, in order to guard against the sad effects of the *touffe*, to abandon the means first pointed out, and have recourse to those above described. Conformably to this, the temperature of the ventilating current must be raised some degrees to render it capable of evaporating an additional quantity of water and to increase the ventilation, to avoid the accumulation of vitiated air, as well as to revive the silk-worms and the leaves upon which they rest. By operating in this way, the desired objects, may probably be attained, and the inconvenience avoided of being obliged to multiply the number of feedings in proportion to the increased temperature given to the ventilating current, in order to obviate the disastrous effects of the *touffe*. As to the persons employed in the cocoonery, it is evident that they would experience less inconvenience from warm air circulating in a brisk current, than they would from the *touffe* out of doors, where the air, though not quite so warm would be stagnant and saturated with watery vapor.

By way of recapitulation, I will observe, that comparatively few of the advantages to be derived from the means recommended for the establishment of healthy cocooneries, have as yet been attained.

The means of cooling the ventilating current have been either neglected, or very imperfectly employed. The apparatus capable of carrying on the forcing system of ventilation in the north of France, has, in the south, proved insufficient for the purpose. The power of the apparatus must, therefore, be increased in warm countries, and, as has been already remarked, nothing is easier than to do this.

No direct means have as yet been used to diminish the quantity of watery vapor contained in the air when this becomes saturated. But every thing is ready to effect this object, if longer experience should show it to be indispensably necessary.

As to the plan of raising the heat of the too

humid air, for the purpose of rendering it more salubrious by rendering it capable of taking up a fresh quantity of moisture, it also can scarcely be said to have had a fair trial.

Notwithstanding all these difficulties, inseparable from the adoption of a new process, in so many places and under such different circumstances, the very advantageous result obtained in well constructed healthy cocooneries, have given them a start and a progress which there is no danger of seeing arrested.

[The following additional remarks of M. D'Arctet are taken from the same publication.]

Since the publication of my first memoir upon the construction of healthy cocooneries, I have been charged with proposing the employment of plans too complex and expensive. I can readily believe that the apparatus which I have described will not be generally adopted without some opposition, and that to the objections already raised others will be added. But the success obtained in 1835, in Camille Beauvais' cocoonery, and the conviction that an old manufacturer, like myself, would propose no new process, which, when faithfully tried, would not be found both practicable and convenient, encourages me to look for ultimate success. Besides, when we consider that the taste for agriculture is spreading among the wealthy classes, that large capitals are already devoted to the development of every branch of rural industry, and that the sciences are put in requisition to favor this happy impulse, are we not warranted in believing that the time has arrived when we can and should make every effort to raise the silk culture above that state of infancy in which it has been left since its introduction into Europe? I may observe that the object under consideration is not merely the production, at considerable expense, of an article of merchandise, commanding a low price, and that in this respect the case is entirely different from what we observe in most branches of productive industry. A well arranged cocoonery costs but little more than one of the kind usually put up. More attention is certainly required for its arrangement; but at the present day, when the march of improvement has made such rapid strides, this difficulty could only exist among those who had not kept up with the spirit of the age. As to the increase in the expenses of daily attendance during the rearing, can any one seriously raise this as an objection, who takes into consideration the great increase of the product both as to quantity and value? A negative answer will certainly be given when it is considered that the cocooneries of Europe, as ordinarily constructed and managed, yield on an average only fifty pounds of cocoons for each ounce of eggs, and that in an establishment well constructed and managed, the product should be at least threefold; that the average price of the reeled silk is 60 francs per kilogramme;—(about six dollars per pound,) and lastly, that France has now to import annually more than 40 millions of francs' worth of silk, which she might easily raise, and the surplus, if any, command a ready market in England, Russia, and the whole of the north of Europe, where the demand for silk stuffs is greatly increasing without the power of raising the raw material. These important considerations will, I trust, put an end to the charges

which have been brought against me, and I hope that the large proprietors will look upon the culture of silk as strictly connected with the manufacturing interests; that they will devote to it their capital and attention, and uniting in their efforts finally succeed in disengaging this branch of agricultural industry from the swaddlingcloths, in which it has so long been invested, and placing it upon the same high footing recently attained by the manufactures of soda, beet sugar, acids, and many other articles, the production of which chemistry has so rapidly brought to a degree of perfection, that, half a century ago, would have been regarded as chimerical.

EXPENSES AND PROCEEDS OF CROPS.

From the Farmers' Cabinet.

In my former communication I gave a concise account of the principal crops of the farm. I will now proceed to do the same with some of the minor ones, or such as do not enter into the regular rotation: and commence with—

Broom corn.—1 acre gravelly loam. Ploughed May 10th, then rolled and well harrowed, struck out the rows quite shallow, about four feet apart—put in four quarts seed with a drill, and ran over it with a light harrow to cover it well: Dressed it with the cultivator on the 14th, and again on the 19th June; finished tending it on the 30th, by throwing a light furrow to the corn, and passing the cultivator after the plough once in a row—bent it several times during August, to prevent the heads from spreading and becoming ill-shaped. Cut the whisks and secured them in the barn in October, afterwards cut the stalks and hauled them into the yard as litter; if the corn had been cut earlier, perhaps these might have been worth preserving as fodder.

Broom Corn.

Dr.	
To plough half a day,	\$1 00
To harrowing three times,	50
To drilling and seed,	25
To tending,	2 00
To gathering,	3 25
To making into brooms,	6 00
	\$13 00

Cr.

By 16 dozen brooms, at \$2.50 per dozen,	\$40 00
Deduct expenses,	13 00
Balance,	27 00

Potatoes.—Three-fourths of an acre, gravelly loam, in corn the year previous. Hauled on twenty ox cart loads stable manure, and spread it evenly; ploughed it in the 21st of May, dropping the cuttings at a distance of nine inches apart, into every third furrow, then rolled the whole, harrowed them ten days after with the common harrow; ran the cultivator through them on 16th and 30th of June; gave them the last dressing with the plough on the 7th July. Gathered them the first week of November. The method practised was, to run a furrow directly along the row with a plough, followed by the pickers, then pass the cultivator over it, and lastly, the common harrow

two or three times—the pickers getting all that appear at each going over; if careful, but few will be missed in this way, and it is much more expeditious than digging them with hand rakes. It required six bushels large seed potatoes, cut into pieces of one eye each, some time before planting, to allow them to dry. They should have been housed earlier in the season.

Potatoes.

Dr.	
To hauling manure one day,	\$3 00
To twenty loads manure, at \$1 per load,	20 00
To ploughing and planting,	3 00
To six bushels seed, at 50 cts. a bushel,	3 00
To tending,	1 00
To gathering,	2 00
	\$32 00

Cr.

By fifty bushels potatoes, at 80 cents per bushel,	\$40 00
Deduct expenses,	32 00
Balance,	\$ 8 00

Ruta bagas.—One acre clay loam, in corn the year previous. Hauled on twenty ox cart loads of barn yard manure, spread it evenly, ploughed it under, and harrowed the ground well about the middle of June. Let it lay until the middle of July, then threw it into ridges two feet and a half apart; put ten loads of compost in the trenches and covered it by splitting the ridges, and throwing a furrow on to it on each side, then rolled it and drilled in three quarters of a pound of seed. Owing to the dry weather they did not make their appearance for more than three weeks after the seed was deposited in the ground. The tending of this crop was not kept account of regularly.

Ruta Bagas.

Dr.	
To twenty loads manure, at \$1 per load,	\$20 00
To ten loads compost,	10 00
To ploughing and harrowing one day,	2 00
To hauling and spreading manure,	3 50
To putting in and seed,	3 50
To tending and pulling, say	5 00
	\$44 00

Cr.

By 200 bushels Ruta Bagas, at 30 cts. per bushel,	\$60 00
Deduct expenses,	44 00
	\$16 00

Beets.—One-fourth of an acre sandy loam, in corn the previous year. May the 18th, hauled on four loads of barn yard manure,—spread it evenly and ploughed it under deeply and harrowed the piece well; then threw it into twenty inch ridges—put two loads of short well rotted manure in the trenches, and ridged over it again, smoothed and levelled the ridges with a rake, and dibbled in the seed by hand, five inches apart. Hoed them on the 11th and 19th of June; on the 25th, immediately after a rain, thinned them to ten inches apart, filling up vacancies with plants taken from where

they were too thick; hoed them the last time on the 13th July. Pulled them early in November. The rows were too contiguous, attempted once to dress the patch with the plough and cultivator, but gave it up as poor business. Thirty inches between the rows, would have allowed of their being dressed by horse, instead of manual power, and then perhaps they would not have suffered as they did, from want of the soil around them being kept open to the influence of the atmosphere. There were about thirty bushels of beets, the tops were used through the growing season as food for pigs.

CRANBERRIES.

From the Cultivator.

These excellent berries are gathered in abundance in the counties of Middlesex and Norfolk. We believe they are more plenty here than in any part of the commonwealth. We can hardly say they are cultivated, for they are the spontaneous growth of many of our poorest, wet meadows. Still we have no doubt they may be improved in size and multiplied in quantity by giving them a little attention.

In Concord, Lexington, Carlisle and other towns in Middlesex, these berries are gathered by means of a very simple and cheap rake, in which they are held until emptied into the basket which is carried for the purpose. And we have been told by some of the trustees of the Middlesex Society, at one of our meetings, that 60 bushels of cranberries had been gathered by one man in a single day.

The vines of the cranberry are not injured by raking, but are rather improved by the process, and when they have been raked for several years in succession, the cranberries may be gathered with greater ease than at first.

These meadows should be flowed during the winter, and the water need not to be drawn off until May. The precise time for drawing it off has not yet been settled, and we solicit communications on the subject.

The berry is a quite wholesome fruit and grateful to the taste. And when apples are scarce the price it commands in the market will well repay the farmer for a little attention to his cranberry meadow. Indeed some farmers who are skilled in the art of gathering think these meadows the most profitable lands they possess.

ON THE CULTURE AND CONSUMPTION OF MANGEL WURZEL.

From the Edinburgh Farmers' Magazine.

I have lately seen a considerable diversity of opinions as to the utility of raising the root called mangel wurzel, or what was some years ago called the root of scarcity; it is a coarse variety of the beet root, well known to every gardener.

In order to ascertain its value as food for cattle, I raised, in the years 1790, 1791, and 1792, a considerable quantity of it, which I found it very easy to do, as it grows to a great bulk in all grounds that are of a deep earth, although of indifferent texture or quality. I had also a quantity of cabbages, of the large coarse Yorkshire sort, and carrots, the same years. I found, by trying the

weight of each, upon a given quantity of square yards, that the mangel wurzel weighed the most; I then set about trying to feed one cow on it, one on carrots, and one on cabbages. I found the two fed with the two last mentioned roots soon took to fattening, and their improvement was every day visible; while the one fed on the root of scarcity, (as it was then called), made no progress. I imputed this to her getting it in too large quantities, and I then gave less. You will observe, I allowed all the three cows to have just as much as they could consume of each sort of food. I found, in so doing, no bad effects from the carrots, nor from the cabbages, except when the cabbages happened to be frosted; in that case, if the animal eat too much, it swelled, but was easily cured by a small quantity of salt-water, blood warm, poured down its throat. But I found, by persisting in feeding on with the mangel wurzel, the animal took on no additional flesh, and rather inclined to scour too much; I was then obliged to desist from my experiment. Having a considerable quantity of the root, I next tried my milk cows with moderate quantities at a time, but did not find it increase the quantity of milk, or improve the quality of the butter, like carrots or fresh cabbages, given in the same quantities. I then gave the remainder to my swine, and found them not so fond of them as they are of potatoes. I of course gave the raising of it up as an unprofitable concern, and am indeed firmly of opinion, that where a farmer can command manures to raise potatoes; carrots, cabbages, and turnips in all their different varieties, he should never spend his time in raising the beet root.

I am, sir, your most obedient servant,

JAS. TROTTER.

Newton, January 10, 1815.

COTTON SEED.

From the Carolina Planter.

I promised to advert again to cotton seed, as a manure. I have said it is the very best we have, and I do not think there is a planter who will disagree with me. It was formerly thought that it was not suitable for cotton—I know planters now who plant—erroneously I think—a double quantity of seed, that a portion of it may serve for manure. I have manured cotton for eight crops with it, and found that it uniformly produced better results than any other manure. It does not last so long, its effects being scarcely visible after the second year, and greatly diminished after the first. I do not think either that it is as easy to obtain and keep a good stand on ground, manured with it—but I have heard that objection made to all kinds of manure—and from my experience I would advise that more seed should be put on manured land in general. Cotton seed is valuable as a manure for gardens, and there is something peculiar in its effects on strawberries, and is sometimes carried to the north for the purpose of improving that delicious fruit. It is, however liable to an objection in gardens. It undoubtedly produces worms, and I have sometimes thought ants.

There is great carelessness and loss in taking care of cotton seed—most persons throw the seed, they save for planting into a bulk, where it heats

and spoils, and occasions a bad stand—while that intended for manure is picked out of the gin house window and left exposed to sun and rain, by means of which, much of the bulk and more of the oil and gas is lost. For the last few years I have had a large room built at the side of my gin house, under the window. The floor I had regularly tongued and grooved, and made water tight, the sides weather boarded, and the top covered with plank as securely as possible. Right under the window, there is a hole in the top in which the seed is thrown—some time in the month of January, I have the top taken off that the rain may get to the seed and destroy the germinating principle—a better plan would be to keep on the top, and a few days before the manure is hauled into the field, have one or more large holes made in it, to the bottom, and fill them with water. Or it may be left a week or so in the field in small piles. However this may be, by preserving the seed from sun and rain as long as possible, more is added or preserved to the amount of the manure than any one would suppose. The bottom of my floor when seed is removed, always appears saturated with oil, and I have no doubt oil would run from the heap, if the floor had been made with a suitable inclination.

This plan I would recommend for the adoption of all who are desirous of increasing the quantity and preserving the quality of their manure at the smallest cost. Some planters haul their seed into the fields as soon as ginned, and pile it on leaves or straw, and making a layer of leaves, and one of seed to the top. This is a good plan—attended, however, with some additional labor, and the loss of something in the quality of the manure. All the virtue imparted by the cotton seed to the leaves is preserved, but not better than in the seed itself in the box, while much is necessarily lost by evaporation. Besides the leaves can scarcely be made very available manure by this process in due time—I have not, however, tried it. Other planters haul their seed into the cow and stable yards, and make a sort of compost. The quality of the compost is greatly improved, and this manure is perhaps the richest in the world, but the loss in quantity is immense and the trouble considerable. Now I go to save time and labor in all things, as much in making and applying manure, as in any thing else.

There are many opinions as to the method of applying the seed as manure, and the quantity to be applied. My plan has been with cotton, to run a furrow, fill it up and bed on it, and with corn to drop the grain and throw a handful on it, and do no more until the corn comes up through it. If it produces worms the sun will kill them—if it produces noxious gases, destructive to vegetable life, they evaporate, and if something is lost in the strength of the manure much time is gained in the method of application. It answers well. I know by experience. Some sow their seed broad cast, plough them in and plant. I cannot think this a good plan, though I have heard it highly commended. For small grain, for which nothing is so good as cotton seed—I know it does well, for every grain then has its manure—but before the corn or cotton roots can well reach the centre of the rows, manure so disposed must be greatly impaired. Some persons contend that not less than a hundred bushels of seed to the

acre will do any good—others that thirty bushels are sufficient. The truth lies between. I usually apply a wagon load lightly thrown on—probably about 70 bushels, on cotton ground, and on corn perhaps not over fifty bushels. Any quantity will do good, and for my own part I have never thought I had done harm by putting too much.

I intended when I began to have said something of the system of purchasing cotton seed for manure, now adopted by many excellent planters, but I have already made this article too long, and most defer my remarks for the present.

SHORT STAPLE.

WONDERS OF CULTIVATION.

From the Carolina Planter.

There is scarcely a vegetable which we now cultivate, that can be found to grow naturally. Buffon has stated that our wheat is a fictitious production, raised to its present condition by the art of agriculture. Rye, rice, barley, or even oats, are not to be found wild, that is to say growing natural in any part of the earth, but have been altered by the industry of mankind from plants not now resembling them, even in such a degree as to enable us to recognize their relations. The acrid and disagreeable *opium graveolens* has been transformed into delicious celery, and the colewort, and plant of scanty leaves, not weighing altogether half an ounce, has been improved into cabbage, whose leaves alone weigh many pounds, or into the cauliflower of considerable dimensions, being only the embryo of a few buds, which in their natural state would not have weighed as many grains. The potato again, whose introduction has added millions to our population, derives its origin from a small bitter root, which grows wild in Chili and Monte Video.

ALLOWANCE OF WATER TO HORSES.

From the Sporting Magazine.

It is by no means an uncommon notion that if horses are to be got into condition for work, they should be allowed to drink but a very small quantity of water. On what physiological basis this opinion is founded, I confess appears to me a perfect mystery. Nevertheless, as many persons adopt this treatment, it is fitting to notice it. For my own part, I have ever found that it is an extremely bad plan to stint a horse in his water, and have consequently always made a practice of leaving plenty of it at all times within reach of every horse I have had. Of course I do not intend to say that when a horse comes in heated from exercise he should be suffered to drink, or should have a bellyfull of water just prior to being ridden; but if a horse be watered *ad libitum* in the morning, he will not require to drink again for some hours, and should never be allowed to do so then unless perfectly cool. Those horses that are only supplied with a limited quantity of water at a time, and are never permitted to slake their thirst fully, will be much more liable to be griped, if at any time they by chance should drink their fill, than those that are always suffered to take as much as nature dictates to them: but should a horse have been hard worked and come into his

stable very hot, I would, after having seen him well dried, only give him a small quantity, for two reasons; first, because his eagerness for water may lead him to drink more at a time than is good for him; and, secondly, because a large quantity of water will probably cause him to break out into a cold sweat, in which he may remain all night if not looked to. After having taken a third, or less, of a stable pailful of water, he should be kept without any for some time, and then be allowed to take what he pleases. When, however, you intend to stint your horses in this way, do not suffer your groom to offer him a pailful of water, and to take it from him when he has drunk a small portion of it, but let just the quantity you wish him to have, and no more, be given to him; he will then feel to a certain degree satisfied with what he gets; whereas by taking from him what he expects to have, he becomes fretful and discontented. In the first instance he makes up his mind to slake his thirst with a short allowance of water; whereas in the second his just expectations are balked in mid career, and his imagination cheated as it were in the height of his enjoyment—and there is much more in this than may be supposed. Physiologists are well aware of the connexion existing between the stomach and the brain; and those who have not inquired into this fact must either do so before they attempt to refute it, or take what I have said as proved.

WITCH [OR WIRE] GRASS.

From the Maine Cultivator.

A writer in the Farmers' Register, whose article we find copied into the New England Farmer, affirms with great confidence, as if he had made a very important discovery, that lands infested with witch grass, may be effectually expurgated of that weed by pasturing sheep upon it. The man is mistaken. He supposes, because the roots, after the land is laid down, become fine and almost imperceptible, that the soil is entirely free from them. If he will plough up and cultivate the land again, he will find that those little fine roots, which he supposes can no longer be witch grass roots, because they are so small, will swell up again and stretch out as they were before being driven into insignificance by the land's having been laid down. We have been deceived in the same way ourselves. A neighbor had a piece of land that was formerly infested with witch grass, but for several years latterly had been devoted to the pasturing of sheep. On turning up the sward with a shovel, it appeared as if there were no longer any witch grass roots in it. Wishing to improve a small garden spot we removed several loads of the soil to the garden and ploughed it in. In a short time the deceitful little roots swelled out, and we found that we had thus unwittingly introduced an enemy to a fearful extent. The theory of the Farmers' Register is a mistaken one.

After all, witch grass is not so bad an affair. It does but little injury to crops if often hoed, keeps the soil light and free—and, as a grass plat, affords the earliest and most constant feed for cattle.—There is no sweeter grass than this, and none that makes better hay when cut early. You can get

three crops of witch grass hay in one season, as well as two crops of any other sort of grass. It is an enemy indeed in the garden, and the best way to exterminate it here, is to dig it all out from the beds by the roots, and carry it off. We have gone over a garden of an acre in this way, and have completely triumphed.

TO FARMERS.

For the Farmers' Register.

No country can be truly wealthy, without being a large agricultural producer. All the commerce and manufactures of England, great and mighty as they are, could never alone enrich her. This assertion may seem a fallacy to some; but it is nevertheless true, that her chief wealth is her enlightened spirit of agriculture. It is from this source mainly that her princely nobles derive their immense income; and of more real comfort than the average of our agricultural community. I speak of the tenantry, not of the laborers; but even this latter class is a thousand times better off than their newspaper statements would lead us to believe. The main attention of America should continue to be her agriculture; they cannot be too often, too earnestly, or too emphatically urged upon the minds of her enterprising sons; pay strict attention to this, and manufactures and commerce will follow as a necessary consequence.

Our wealth and strength will be greatly increased; we shall obtain a much greater average crop from the same number of acres under cultivation, having better roads, better buildings, and above all a more enlightened and thorough education to the agricultural community. If any one class of men in our great republic is to be better educated than another, it should be the directors of the agriculture of the country. A PUPIL.

Chesterfield, 1840.

ARTESIAN WELL AT GRENELLE.

From the Mining Review.

At the last sitting of the Academy of Science, M. Arago stated that he had that morning been making some thermometrical experiments at the Artesian well at Grenelle, in order to ascertain the temperature at the depth which had already been attained, viz., 483 metres, or 1584 feet. When the workmen had reached 460 metres the chalk was of a green color, indicating the proximity of water. Since then the chalk had become mixed with clay, and of a dark color, a still stronger indication that the sheet of water which it is intended to meet is near. M. Arago used the thermometer of M. Walferdin, and after having taken all the necessary precautions in order that the pressure, which at such a depth is equal to fifty atmospheres, might not injure the bulb, six thermometers of the same kind were successively let down to a depth of 481 metres, care having been taken not to lower them until thirty-six hours had elapsed after the boring, in order that the heat which this work might have communicated should have subsided. The thermometers were left in the well for thirty-six hours. The heat at this depth was twenty-

seven degrees of Reaumur, or 92½ of Fahrenheit, being about twenty-three metres for each degree of temperature. M. Arago expressed a hope that no water might be found for 100 metres more, as in that case there would be a permanent hot spring at the very gates of Paris.

REVIEW OF A "NEW ESSAY ON FLORIN GRASS, INCLUDING THE HISTORY OF ITS DISCOVERY, AND AN ACCOUNT OF ITS VALUABLE QUALITIES, AND MODE OF CULTURE." BY WILLIAM RICHARDSON, D. D. London, Harding, 1813. pp. 91.

From the Edinburgh Farmers' Magazine.

Dr. R. is certainly one of the most persevering, indefatigable, and patriotic characters of the present age. It is very fortunate for the world, that a discovery of such importance as that of florin should have been made by such a gentleman. There are very few, indeed, who would have encountered, with so much disinterested zeal and fortitude, the host of enemies that have assailed him; and scarcely any that could have acquitted themselves with so much ability. Like some other great heroes, he does appear at times to be a little irascible; but that is not to be wondered at, when it is considered that "he has been attacked from all quarters; and, while his florin was only gaining ground by inches, he had as many battles to fight in support of this native vegetable, as Henry the Fourth had to engage in for the recovery of his hereditary kingdom." So much paper indeed has been expended in these numerous conflicts, and so true it is, that, after all, florin has only gained ground by inches, that it is not improbable the whole of the crops in Scotland might be covered by the learned and unlearned essays, letters, and dissertations, that have been written and printed respecting this wonderful grass;—a melancholy proof certainly of the obstinate prejudices of mankind against every new discovery, however valuable. And yet we must say, for the honor of our country, upon the authority of Dr. R. himself, that we are much more open to conviction, and much more tractable, than our southern neighbors.

Concerning several late discoveries, such as the culture of wheat in the Highlands of Scotland, the inexpediency of summer-fallow on heavy soils, and others of the same kind, a difference of opinion still prevails; and, with regard to the notable expedient of reducing the several breeds of live-stock to a single breed, the difficulty of providing a sufficiency of winter food in many parts of Scotland appeared to be almost unsurmountable. Red clover and rye-grass will afford but a poor crop on the bleak heathy mountain; and neither turnip, nor even ruta baga, are found capable of resisting the successive frosts and thaws of our severe climate, even if it were possible to raise good crops of them in such situations. Hence any kind of herbage that would supply the place of hay and succulent food in our mountain districts, must always have been a most important desideratum.

When it was said, a few years ago, that the most barren moors and moorsses could produce such herbage, and that there was a native vegetable to be found every where, which, upon such land, would yield a crop of hay thrice the weight of that

of the best meadows of England, and of a far superior quality, it was naturally to be expected that farmers would be somewhat incredulous. But now that the fact has been ascertained, and indeed 'demonstrated' by Dr. R., it is quite unaccountable to find men still exclaiming against a discovery for which they had long wished, and against a crop, from the want of which they had felt much loss, and always very serious inconvenience.

It would have been our duty, long ago, to have laid before our readers some very excellent specimens of controversial acumen on this subject, had it not appeared to be more "decent and honorable" (to adopt the words of our author) "to leave the projector a clear stage, and a fair opportunity to make his own way." As he very judiciously adds, "if his discovery was nothing, and his schemes futile, the world would soon detect him, as they have already so often of themselves detected and ridiculed the puffed discoveries of pompous charlatans." But it is now full time that the benefit of our author's discovery should be extended over every part of Scotland at least, and that we should contribute our mite for that purpose. If our English readers should still remain obstinate and perverse, they have only themselves to blame for the consequences.

The first questions that it seems natural to ask about this grass regard the discovery of it—its properties—the amount of its produce—and its application.

Second, It must be desirable to know upon what soils it will prosper, and how it should be cultivated.

Lastly, What are the peculiar advantages to be obtained from its culture to individuals, in the first instance, and ultimately to the public at large?

In arranging and condensing Dr. R.'s observations, under these several heads, it may be necessary to notice, very shortly, the objections that have been made to his statements; and also the omissions, which it may be readily believed will often be chargeable against a writer whose mind is too much occupied with leading topics, to suffer him to attend to minute details.

To the *discovery* of the valuable properties of this grass, our author positively lays claim, and gives a full account of the steps by which he had acquired this knowledge. These properties, he observes, "have escaped the attention of man for five thousand years." This discovery, too, "of which the world begins now to feel the importance, was not the result of accident, or a *lucky hit*, thrown in my way by good fortune, but the very thing I was in search of." Notwithstanding this the doctor admits, that "the aborigines of the British isles seem all to have had some vague notion of the value of florin;" that it was not "unknown to the botanical writers of the seventeenth century;" that 25 years ago, "the Reverend Marcus M'Cousland, descending on the value of a piece of ground he had recovered from the sea," exclaimed, "See, it is all florin!" and that the natives of the wild parts of Donegal, always charged a higher price for florin hay, though spontaneous, than for that made of other grass. All this time the Doctor did not even know it. He had taken pains, about eight years ago, to procure some plants, but did not succeed; and at last found a tenant who said he knew the grass. "I went with him to my bog, where he showed it to

me in abundance." After some experiments with nine roots raised from this bog, the author laid down a rood with fiorin, after a crop of potatoes, on the 15th November 1806.

It is not our business to reconcile these accounts. One thing cannot be disputed. The doctor has the merit of having first discovered that it was infinitely more valuable than any other grass, and than any other person seems ever to have imagined, or will yet believe. Mr. Wakefield, in his late account of Ireland, not only denies the author's right to this discovery, but that he was even the first cultivator of it; and refers to the surveys of Tyrone and Derry, to prove that it had been previously cultivated by Mr. M'Evoy, and the Reverend Mr. Samson. In reply to this, our author very liberally abuses Mr. Wakefield, and seems to withdraw his pretensions.

Be this as it may, it is of more importance to be able to distinguish this grass from every other; and, to all appearance, this is no easy matter. "The slightest assistance is not to be derived from botanical books;" and, in the whole of this essay, there is not a word of description to enable the reader to select the fiorin cultivated by Dr. R. from other stoloniferous grasses. At one time, his directions to those who sought for fiorin stolones, were, "to raise the grass growing in contact with the north wall of their parish church, telling them they would find it to be fiorin." But this simple expedient must not be depended on for success, now that it appears from Sir H. Davy's experiments that there are at least two varieties;—the *latifolia* cultivated by Dr. R., and the *angustifolia*, of much less value.

Respecting its properties also, the information is not quite so full and satisfactory as might be wished. It would have been of importance to know the weight of it consumed by horses and cattle, that it might be compared with that of other hay; and particularly, whether horses enjoy the same health and vigor when fed on dry fiorin, as on good clover and rye-grass hay. Yet a vegetable, which possesses the properties ascribed to fiorin in the following extracts, must be of extreme importance.

"See the contrast—our native fiorin has no disorders, no enemies; the vicissitudes of season make no impression upon it; and this hardy grass vegetates in the severest frost; its stolones continue to lengthen under the snow: deluges of rain do not in the least injure it; and if Nature has thrown its period of perfection into the winter season, she has had the kindness amply to compensate by making both the plan and its enormous crop equally insensible to the severities attendant on the season. And though we cannot accumulate a fiorin crop in the short and moist days of the brumal months, we can consume it to the greatest advantage in that period; and should we mow more than we can use, we know that fiorin grass will remain on the ground without injury, until the lengthening day brings sufficient drought to enable us to convert into excellent hay, both what was cut, and what was left uncut through the winter." p. 25.

"During the time I was thus endeavoring to ascertain the extent to which fiorin culture might be carried, I was equally diligent in trying the various modes in which it might be applied to use in rural economy. I soon discovered that either dry or green fiorin enriched the milk of the cows fed

upon it, more than any other food I had ever tried, and that its fattening powers far exceeded those of any other hay; that as a green food, its value was incalculable, coming in aid of the soiling system early in September, and continuing a most luxuriant and succulent food, even until the middle of May." p. 19, 20.

There is nothing, one should think, can be better ascertained than the amount of its produce:—for a great number of high authorities, high at least in point of rank and general knowledge, have been adduced; and his people have been examined on oath respecting its weight and other circumstances.

"The following statements of quantity of fiorin crop, are established with precision, viz.

"1808, Seven ton, four hundred, one quarter, four pounds.

1809, Eight ton, five hundred, two quarters, twenty-four pounds.

1810, Season so desperate, never weighed.

1811, Eight ton and upwards."

From this and other statements, the doctor infers "that fiorin grass produces treble crops of hay,—that at least is completely established;—as, of 6 crops carefully weighed, every one of them far exceeded treble the highest average ever made from a hay crop."

The only objections that have been made to this inference are, that others cannot raise such great crops, not even the half of these weights; that fiorin grass does not "produce" hay at all,—though it is perhaps something better; and that it is absurd and fallacious to compare a crop produced in 6 or 8 weeks only, with one which requires to occupy the ground for a whole year. It has been said, with some appearance of reason, that the author should have brought into view the early spring food obtained from meadows and artificial grasses, and also the second and sometimes third crops after the hay crop, or the value of the pasture till the fields are again shut up for hay, or ploughed for a crop in March. Fiorin gives neither early pasture so valuable for ewes and lambs and fattening stock, nor a second crop which may be either cut for hay or soiling, nor any after eatage, like the land which produces the hay with which it is compared.

The application of the author's crops is nowhere distinctly stated. One cannot but wish for particulars on this head. How many horses, cattle and sheep does he support from a given quantity of land under fiorin? The weight of the crop is of itself no criterion of value. Of this succulent food perhaps twice the weight of hay is consumed.

In the second place, it must be desirable to know upon what soils fiorin will prosper, and how it should be cultivated.

With regard to the kind of soil it seems to be of no consequence whatever. The doctor has raised excellent meadows on miry bog, so wet, that he describes it, in Ovid's words, as being "*Instabilis terra innabilis unda*." It grows spontaneously on dry sandy grounds, with so much vigor, that he has recommended its cultivation on the blowing sands of the Hebrides, as an excellent expedient for preventing the destruction of the contiguous land, and at the same time converting these blowing sands into better meadow than any in England. There is very little concerning the mode of cultivating it in this essay, which in this instance does

not very well accord with its title; but it has been already described in this and various other journals. The doctor's rood laid down in November, 1806, is "light dry upland ground, and got a very weak top-dressing every year; always turf mould with a little ashes." The sixth crop, mown in October, 1812, was like all the former ones very fine.

The greater part of the essay is occupied with a display of the vast advantage that cannot fail to be derived from this important discovery, both to individuals and the public at large; which was the last branch of our inquiry. Fortunately, on this point there is little more to be wished for. It is now only necessary to consider its advantages in a national view; and here we must give Dr. R. the merit of having made more of his premises, such as they are, than perhaps any other gentleman in the united kingdom could have done.

The doctor's first object is to show, that "it shall not again be necessary either to import grain or export bullion;" but that we shall resume our former enviable description—a *grain exporting country*." To establish this comfortable conclusion, the country is divided into land of three descriptions. The first includes "boggy and miry ground contiguous to the farms or demesnes of proprietors."

"The discovery of the facility with which these *now* unprofitable wastes may be made, at small expense: to produce crops of the highest value, will no doubt bring many of their proprietors into action; superabundance of hay will be the immediate result; what then becomes of the ancient meadows that have hitherto supplied Mr. Miller, and the gentlemen of this description with hay? must they not be instantly converted into tillage grounds? and with the advantage of a profusion of manure, derived from the cattle fed from meadows which never require animal dung, ashes from the spot answering the same purpose. The immense addition to our grain crops that will arise from this source, must be obvious to every one, who has travelled through Ireland, Scotland, and more particularly the north of England.

"The next description comprehends the extensive grazing farms scattered through the mountain districts of our islands. The cattle fed upon these bleak pastures through the summer, are at present sold off, or sent elsewhere to find sustenance through the winter.

"But now, since we became acquainted with this hardy vegetable, we know that we can make fiorin meadows on the cheapest terms, and to any extent, through every part of these dreary regions, which will not again be depopulated in winter, their cattle finding food within their own limits, in greater abundance in winter than in summer; and administered to them with the greatest facility."

"The third is by far the 'most important of the three descriptions of ground,' and comprehends the cultivated farms spread over the whole face of our islands. To introduce fiorin culture here, the author very judiciously considers, that two positions must be established—first, that fiorin "produces steadily hay crops more than treble the amount of what we now mow from the same extent of ground." Of this there can no longer be any doubt; for he assures us, "that the lowest amount of an acre of fiorin he ever knew weighed was seven load 200 lib. The second position re-

gards the great value of fiorin, which is equally well established. These points being thus settled, "let us try the result, and see what effect is likely to be produced on the third description of territory into which I have supposed our islands to be divided; to wit, the mass of cultivated farms spread over England and Wales, stated to amount to 11,500,000 acres of arable, and 6,000,000 acres of meadow. Vast quantities of these meadows must rapidly be laid down with a new grass, admitted to produce treble as much hay as is afforded by the grasses now clothing our present meadows; and vast quantities of them must be applied to tillage, the proprietors being supplied with better and more abundant hay from one-third of the same ground. How much the eleven one-half million acres of arable will be augmented by this transfer, and how far the six million acres of meadow will be reduced, are questions to be answered only by conjecture.

I am sure I make great concessions, if I admit one-third of our meadows to remain in their present state, after the proprietor is convinced that he has it in his power to treble their crops, and that one-third only is laid down with fiorin. We add then two million acres (the other third) to our tillage ground, and we increase our hay crop by one-third. Our tillage ground, 11,500,000 acres at present, is increased by more than one-sixth; we can now throw some light on the subject, limiting ourselves to wheat. Other crops applicable to the food of man will no doubt be also raised; but I do not take these into consideration, leaving them out to make my general conclusions more secure.

"Mr. M'Pherson makes the average produce of wheat in England and Wales 8,000,000 quarters; let us suppose the same proportion to hold in the two million acres we have added to our tillage ground, and we add annually to our present produce of wheat one-sixth, that is, 1,333,333 quarters of wheat. The average importation before 1797, was 400,000 quarters for some years; in 1799, 415,647; in 1800, it was 1,174,654 quarters; and in 1801, 1,186,236; thus it appears, that the quantity of wheat likely to be brought by the introduction of fiorin grass into general use, is more than treble the average importation for many years, and exceeds the importation in either of the two years of famine, when it rose to a height it had never approached before. I fear the importations of late have been weightier; but I have not yet received a statement of them. Whoever attends minutely to my calculations, will find I have much to spare.

"Surely with the great addition I have made to our resources, we shall never be obliged to import another quarter of wheat, or to send one guinea abroad for food; no, but we shall soon resume our former enviable description—a *grain exporting country*.

Let us try the question in another point of view. We have added two million acres to our tillage ground, and it is not unreasonable to suppose each of these produces a crop of wheat every fourth year; for the meadows we transfer to tillage are our very best ground. Dropping then (as before) all consideration of other crops, we have thus made an annual addition to our wheat crops of 500,000 acres of wheat, which, at three quarters per acre, gives us a steady increase of 1,500,000 quarters, still more than the preceding amount.

The approximation of these two results, tends much to confirm the fairness of each of them.

I must observe, that although these results so completely establish my friend Mr. Miller's position, as to the effects the introduction of fiorin grass must necessarily produce; yet they are deduced from but one of the three descriptions of ground into which I have divided our islands, viz. our present cultivated farms.

The addition that will be made to our grain crops by the cultivation of fiorin on our peaty moors, upon which I have already dwelled, is not taken into consideration. Neither is the improvement and extensions our agricultural fields must derive from scattering meadows, clothed with this luxuriant grass, through all the dreary mountain tracts so profusely spread over Great Britain and Ireland, called in aid of my friend's position, "that it shall not again be necessary either to import grain, or export our bullion, p. 47-51.

Upon these very ingenious calculations and deductions and suppositions, it does not seem to be our business to offer much of remark. Unfortunately we have enough of "miry boggy land," and also of mountain tracts, but scarcely any meadow that can be converted into arable land. It was, therefore, very proper to confine the preceding statements to England, though it might have been as well to have begun with the wastes, instead of the meadows. If the English meadows are to be broken up, which is not a very probable occurrence, those concerned will no doubt be fully satisfied about the foundation upon which this splendid superstructure is to be reared—the treble crops and superior quality of fiorin. They may still, however, have to choose between a regular rotation of grain crops, and clovers and turnips, and a fiorin meadow one-third the extent of their present alternate meadows and pastures. They must also consider whether this diminution of their pastures will not occasion a scarcity of butcher-meat and dairy produce, to place against the superabundance of grain. For fiorin, though it is said to be found in all our pastures, does not itself admit of being pastured—facts, like several others, somewhat perplexing and discordant. Another difficulty occurs about manuring the fiorin every year. In Scotland, there is always both a grain and a cattle crop raised from one dunging, and more commonly two of each; on English meadows, first year a hay crop, and the next year pasture. On the miry bogs and mountain farms, all that is necessary is to procure ashes, by burning the nearest wild land, or, according to the good practice of our forefathers, to enrich one spot by the ruin of ten times its extent: but this cannot well be done on "cultivated farms." The compost of dung, ashes, and lime, afterwards recommended, or the plain earth alone to be applied to the oak-land, are not always to be got; and if recourse is had to dung by itself for this yearly top-dressing, the land in tillage may be somewhat defrauded. Besides all this, it might have occurred to Dr. R., that the population of Great Britain will certainly increase with the increase of food; that there is no country to which a temporary surplus can be exported, unless by means of a large bounty, and therefore that no surplus will be produced; and that, much as the continuance of the late excessive importation may be deprecated, it is perhaps quite as enviable, that Britain

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should continue to clothe other countries, as to feed them with her raw produce. Dr. R., with a view to this point, may compare the condition of the laboring classes of England, which imports so largely, with that of those on his side of the water, from whence large exportations have been lately made.

A great many other beneficial effects would result from the cultivation of fiorin, which we have only room to enumerate. 1st, It would "restrain the occasional enormous rise of the poor-rates, by preventing the recurrence of scarcity and dearth. 2d, It would both maintain and employ our population. 3d, The increase of our agricultural population is a necessary consequence. 4th, "The introduction of fiorin will make an era of much importance to the breeders and feeders of sheep," and probably lead to a great improvement of wool. 5th, Fiorin is very proper for being distilled, and yields excellent spirits; and last of all, though not least, "it shall now appear capable of contributing materially to our national strength and defence."

"I little thought, when I was developing successively the different valuable qualities of fiorin, that I should discover this diminutive grass might be made an important friend to our navy, and a useful associate in raising oak for its supply.

"The properties of the oak, connected with my plan, are two—a distinct solitary stem, and great slowness of growth. Each of these is highly favorable to the measure I propose, that is, to make the same enclosure an oak plantation and a fiorin meadow; by the former the erect oaks will little interfere with the fiorin crop; by the latter the proprietor will long enjoy the benefit of a valuable fiorin meadow."

This brilliant conception is then illustrated at some length; but our limits for such an article have been already exceeded. Those who wish to know the value of coppices and standard reserves, and of the yearly thinnings of a mixed plantation, will find some information in the first branch of this number; and may choose between our author's fiorin, and either of these methods of rearing timber trees.

If we should now bring this article to a conclusion, we should probably disappoint the just expectation of many of our readers. Of this essay, then, we will say, that from beginning to end it is written in the language of enthusiasm; and the author either knows not, or spurns at the dictates of reason and experience. A very slight acquaintance with the most approved practices of modern husbandry would have convinced him, that there is very little room in it, for a plant, which can neither supply the place of old feeding pastures, nor of artificial grasses, nor of winter crops of common and Swedish turnips. From these lofty anticipations, let us turn to such facts as seem deducible from our present very limited experience.

We do not fear being contradicted by any person in Scotland, who has attempted the cultivation of fiorin, when we say that it is altogether unsuitable for arable lands. Should any farmer in the Lothians or Berwickshire, plant fiorin upon any considerable portion of land, capable of growing clovers or turnips, it would be held a decisive proof that his mind was fast verging to confirmed insanity. A few small patches of such land have been planted by way of experiment along-side of tillage crops; and it will not be easy to prevail with those

who made these experiments, or with such as had access to inspect them, to make any new trials.

Upon dry sandy soils, of whatever quality, florin has produced a very insignificant crop. Some of the Scottish gentlemen, to whom the doctor refers, will not hesitate to admit this. A piece of land, laid down in May 1812, under the doctor's personal superintendence, gave a crop of about 3 tons per Scots acre of half-dried grass last year, and this year scarcely a plant was to be found. Another spot, carrying the first crop, which had been treated *secundum artem* by another of the doctor's pupils, was inspected a few weeks ago. The crop was miserable upon the high parts of the field, but not so bad at the bottom, where the soil was moist and deep. It might average about half a ton per Scotch acre, and was to be ploughed up as soon as the crop was removed. The same gentleman had another patch carrying a crop of the third year, which at the end of September his servants were cutting for the stables. The ground appeared fully stocked with plants; the soil was a rich deep sandy loam, worth 3 guineas an acre. The crop last year weighed 150 Scots stones ($1\frac{1}{2}$ ton) per Scots acre; and it was estimated at the same weight this year. A third gentleman laid down 12 acres with florin in a situation where he expected to have the command of water for irrigation. The water was not thrown over it in a sufficient manner; and though it got a good top dressing, the crop has altogether failed. It is needless to enumerate more instances of the same kind.

The only description of land where this cultivation has been in any degree successful in Scotland is that with which the doctor himself began his experiments—"miry bog." Such land has certainly in some cases produced a great weight of this aquatic; and should it remain in the soil, of which one of the earliest cultivators now entertains much doubt, it must be considered as a most valuable discovery. Every thing that can be got from such land, after expenses are defrayed, may be considered as clear gain; and in those situations, where neither clover nor turnips can be raised, florin may probably be of very great importance as a succulent food for cattle in winter and spring. Wherever irrigation can be practised, there is reason to hope for the same result; though where the soil is dry, meadows will be much more profitably occupied by such plants as give early and late pasture, with a moderate hay crop between them.

We shall only offer one remark more. There is no considerate person, who can read this essay, without feeling a thorough conviction that Dr. R. has greatly "overstepped the modesty of nature," and provoked opposition by his lofty pretensions. It is unjust to charge landholders and farmers with an indiscriminate and inveterate hostility to innovation. There is no class of society more open to conviction, nor more ready to adopt every new practice, which gives a fair promise of augmenting the value of their produce, than that of the farmers of the arable districts of Scotland. Florin has now been tried for several years; and such are the results. If they should be called in question, by those who really wish for information, and not for controversy, they can easily be referred to the places to which we have alluded, where ocular inspection will in a moment dissipate the illusions raised by a thousand pages of declamation.

OBSERVATIONS ON THE CULTIVATION OF THE SUGAR BEET.*

The value and importance of the sugar beet as an addition to the agricultural productions of the farm, and an increase to the resources of the nation, is but commencing to develop itself. Wherever it has been tried, as food for cattle, it has given satisfaction.

So late as the year 1836, the sugar beet was first introduced into the United States, by a society in Philadelphia, whose object was to ascertain its value as a source from which sugar could be advantageously procured; and in pursuance of this object, that society sent an agent to Europe to observe and report the success that had attended the efforts of the French chemists and manufacturers; this led to the introduction of the seed. It is not the purpose of this paper to enter upon the sugar business; it is sufficient to observe that it has been so very successful in France, that it threatened to supersede the use of foreign sugar, and those merchants who were engaged in its importation, and interested in the sugar colonies, foreseeing the loss of what was their most important branch of business, applied to the French government for protection, and the consequence has been, that sugar made from beets in France has been subjected to an excise duty. It is possible, that the French government was apprehensive that the profits arising from making sugar from beets, might induce an undue proportion of land to be withdrawn from the production of grain, and employed in raising beets; and likewise the fear of lessening the commercial marine, influenced the imposing of this excise duty, and it gave to the mercantile and colonial interests, the protection they petitioned for.

The society referred to, had no intention of becoming a manufacturing one; the object being simply to ascertain and publish all the facts that could be procured relating to this new process of making sugar, import and disseminate some of the seeds, and the information that had been procured; when these objects were accomplished, the members paid the expenses and closed the concern. Up to this time there has been no manufactory for making beet sugar established in the United States.—Several trials have been made on an experimental scale;—the results of these went to confirm the practicability of what was stated to have been done in Europe, to wit: the crystallizing the saccharine matter of the beet.

The discoveries in modern chemistry, having shown, that saccharine or the element of sweetness is the basis of sugar, wine, vinegar, honey, &c. and as this element exists in beets and in grapes, it has led to the presumption, that wine may be made from beets, as well as from grapes; and in a letter from Paris, of date so late as October 16th, we find an intelligent gentleman, and a friend to the United States, writes to the following effect:

"By-the-by, you must know that our public papers have been of late full of another discovery, and that is beet wine. What do you think of that, my friend? Sugar being the principle, without which no vinous, fermented or distilled alcoholic liquor can be made, and the beet containing more

* Originally published in pamphlet form—Philadelphia, 1840.

saccharine matter than even the grape, why should the sweet beet not be used to make wine, if it can be divested of its empyreumatic oil and flavor, as it is in making sugar? The beet wine fever is now raging in France, as the *morua multicaulis* rages in the United States. Of its success in this grape-growing, wine-making country, I shall, as it develops, keep you advised."

The cultivation of this plant being new and interesting to the farmers of the United States, it may be useful to lay before them a few observations on the subject, for which we are mainly indebted to the gentleman to whom we have already referred; and what is said must be received as general principles; the practice that will suit in Maine will not answer in Georgia, and yet the beet is a plant that will thrive throughout the whole extent of the United States; and as a food for cattle will prove for this country all that the turnip is for the moist and humid climate of Great Britain.

Cultivation of beet.—The beet is a biennial plant growing to seed the second year, its seed-stalk rises to the height of from three to five feet. It is from the root, and in the first year of its growth that the sugar is extracted. As yet the process of extracting sugar from beet has not been made sufficiently perfect to obtain the whole saccharine matter, as in the case of the sugar cane, therefore the residue forms excellent food for cattle.

Choice of ground.—Beet thrives in the soil suited to the potato, to wit; in all soils that are somewhat sandy and loamy—these soils mixed with vegetable mould and decayed matter are particularly suitable. From land essentially sandy much cannot be expected, unless it be highly manured; under these circumstances we have seen a good crop growing in New Jersey. In the absence of manure the roots will be small, but where they grow fresh and healthy, it has been found that small plants yield a large proportion of sugar—but this by no means makes up for the want of mass, and therefore with this as with other crops—it is proper to use land naturally or artificially good, to insure large returns. Clay may be added to sandy soil, and sand mixed with clay ground, to correct their defects, but the process is expensive.

Where land is essentially stiff clay, it is not suitable for beets, because the seed germinates badly and the root, finding it difficult to penetrate and imbed itself, becomes forked and rises too much above the surface, whereby it is too much exposed to the sun and atmosphere, which dispose it to become hard and reedy. One of the evils attending forked roots is, that stones, gravel, and earth get enveloped in the interstices, and thus blunt and injure the machine that is employed to reduce the roots to pulp, when the object is to make sugar. Clay soils are improved by deep and frequent ploughing and harrowing; the manures best suited to this kind of ground, are half rotted straw, fresh stable dung, leaves, &c. and sand can be employed to advantage where it can be had with little labor; the quantity required to produce useful effects has to be very considerable. In France calcareous soils are not considered suited for growing beets. In America we may mistake what the French refer to, when on this occasion they use the term "calcareous;" possibly it may be by them applied to chalk soil, a kind of land we have none of, and not refer to the limestone land that

abounds here, and is justly held in high estimation, as it answers well for all crops. The farmers of America must not be deterred from trying to cultivate beets on limestone land, because it is said of other countries, calcareous soils are not suited for growing that root; in this, as in many other cases, we must determine the fact by our own experience. Here, on limestone land, the beet may suffer from drought, but all crops grown upon it are exposed to the same effects. In France, the products on different soils vary very much, and are greatly influenced by better or worse management, the difference rating from fifty to two hundred.

Preparation of the ground.—This will vary according to the nature of the soil, and here, as in all other departments of the farming business, much of the success depends on the skill and judgment of the farmer. In many cases three ploughings will be necessary, and one of these ploughings should be before winter, that the turned up soil may be mellowed by the frost, the last ploughing has to be in the spring immediately before planting the seed; two ploughings in this country will be found sufficient; in all cases it should be well harrowed, and rolling will be an improvement that amply repays the expense. Deep ploughing is generally useful, but the farmer has to consider the nature of the substrata. It would be improper to turn up much of the poor clay or gravel bottom, and where the substrata is an open sand, deep ploughing is not required. Manure, in which the process of fermentation has not advanced far, will answer best for beets; nevertheless all kinds are useful; but the half rotten best divides the soil and suffers the roots freely to expand. In the state of Delaware, marl has been found an excellent manure for beets, and marl is found in many places in the low light soils on the Atlantic coast south of Sandy Hook. Some farmers in France allow the beet leaves that are cut off at harvest-time to remain on the land, and consider them a tolerably good manure, but this practice is not so good as having them carted into the barn yard to be eaten and trodden on by the cattle. It will be found that straw of any kind when properly laid into the furrows and covered with the mould, will give good crops; and this open species of manure is suited to clay soils and the beet root. The roller is especially necessary on clay soils; by it clods are well broken, which favors the coming up of the plants, and facilitates the future hoeings and horse-hoe weeding.

Of sowing.—There are four ways of sowing beets, first in beds as in a nursery; second, broad cast as in sowing wheat; third, sowing or dropping by the hand in drills; and fourth, drilling by a machine.

By the first of these methods the whole of the seed is sown on a small portion of land compared with what it is intended to occupy; these plants will be fit to pull up and plant out where they are finally to remain, in a month or six weeks from the time of sowing; this planting is performed by means of a dibble with which holes are made in the ground, always a little deeper than the length of the plant that is to be put into them, and with this dibble the earth must be carefully pressed close to the root. This method is attended with several inconveniences; it requires much manual labor, the roots are exposed to injury during the

process of transplanting, and if the root is bent in the planting, the beet will form badly, and in place of having the shape of a cone will be deformed and unthrifty, with numerous roots filled with earth, which will be detrimental to the crop, whether used for feeding cattle or employed to make sugar. This mode of sowing should be thought of only where seed is scarce, the quantity to be sown not great, and labor easily procured.

Broad cast. This manner is the simplest, but requires a large quantity of seed, and will be expensive where that is dear, and seed in the European market has on some occasions been five times dearer than on others. In this practice it will be found that six pounds of seed will be required where two and a half or three would have been enough when planted in drills by the hand. The whole of the soil in the broad cast sowing is occupied, but it is difficult and expensive to hoe the crop, and keep it free of weeds, and the produce is never as great as by the following method.

Rows or drills. The little furrows into which the seeds are to be dropped are made by a harrow, having the teeth at the distance one from another that the rows of beets are intended to be from each other and the seed is dropped two or three into the drills at the distance of twelve to eighteen inches apart from each other. This work can be performed by young people; in France it is most frequently done by women, as more dependence can be placed in them than in boys. After the planting is finished, the seeds are covered by having a light harrow with plenty of teeth in it drawn over the ground. In this way there is a great saving of seed and the plants are regularly spaced. Four women will plant an acre in a day. By using a drill drawn by a horse, the labor is very much abridged and the work will be expedited. This machine is very important to those who plant large fields; in the large sugar making districts it is used with great success, it is of various forms and merits; the plants have not yet been brought to this country. Some French farmers place the rows twenty four inches apart, perhaps thirty will be found a more convenient distance for the horse-hoe, cultivator, or harrow. In fixing the distance that is to be between the rows, reference should be had to the kind of horse-hoe that is to be used in keeping the crops free from weeds. The distance in the row may be from twelve to eighteen inches. When the plants are far from each other the roots will grow to a large size, and the contrary will result from planting them close. By careful observation farmers have to learn the distance that will produce the largest quantity, and best quality of roots on their respective soils. The seed should be planted at the depth of from one to two inches. Experience has proved, that at a greater depth, especially on heavy soils, it is not sufficiently exposed to the action of the air, sun and moisture; without which it will not germinate well.

Time of sowing.—This depends on the position of the place and nature of the soil; as a general rule, the earlier the better: provided, the land is dry and in proper order, early sowing is particularly important when the object is to make sugar, because the roots arrive sooner at maturity and allow the process of crushing to commence early. In France it has been found that in September and October the greatest quantity of sugar can be ex-

tracted from the roots. In the United States, the nature of the fall season is very suitable for making sugar. The season for working here will be longer than it is in France, this will favor the manufacture here when it becomes a business. In Pennsylvania, beet sown so late as the first ten days of June came to perfection; but late sowing, exposes the young plants to be injured by the drought of that season, and the heat of the sun; we have heard of an instance where by accident some beet seed had been dropped in the fall and remained in the ground all winter, and in spring vegetated well, and yielded a good crop. This accident suggests the trying how far it would answer to sow a part of the crop in fall, so as to have an early crop, and what the result would be of having from this early sowing, the ground well covered with leaves before the summer's hot sun comes on. If fall sowing shall be found to answer, it would be of advantage to the farmer, by allowing him to have a part of the spring work done in a season in which he is not much hurried. This fall sowing should not be performed until late in the season, when all probability of warm weather has passed away, so that there might not be heat to germinate the seed before the cold and frost set in.

Of Hoeing.—Few plants suffer more than the beet from neglect, and the baneful influence of weeds in the first stages of its vegetation. The ground therefore has to be kept free of weeds, and it should be kept mellow during the first stages of the plants' development. Beets require one or two hand thinnings, and as many hand hoeings. The first of the hoeings should be about when four or five of the leaves have put out, the second in from three to five weeks afterwards. Here it is proper to remark, that each of the burs that are planted is a cluster containing sometimes as many as four seeds; this is to be perceived by breaking one of these burs, in it will be found several small grains of white flour, and each gives out a separate plant. Mice are fond of this flour and will destroy the seed if they can get at it. All the plants save one must be pulled up at the time of hoeing; if not properly thinned there will be a cluster of leaves but very small roots; where there are blanks, they should be filled up with those pulled up from where there are too many. After the rows have been carefully freed from weeds and properly thinned, the horse-hoe, cultivator or drill harrow can be advantageously run between the rows. The horse-hoe, &c. has to be some inches narrower than the distance from row to row, and after each horse-hoeing, a person should go along the rows with a hand hoe, and remove the earth from such plants as may have had it thrown on them by the harrow, &c. If any of the beets should show a disposition to shoot out into the seed stalk, this must be stopped by cutting off these stalks, because this growth would be at the expense of the root. Some persons pull off a portion of the leaves to feed their cattle; the leaves also make excellent greens for the table; it is probable that taking these leaves is some detriment to the roots.

Harvesting.—The season for taking up the roots will vary with circumstances and localities, early and late sowing, &c. &c. In France beets ripen and the making of sugar commences about the end of September or beginning of October, and the evidences of the plant being ripe are the

falling down of the leaves, and those of a bright green turning yellow and brown. The influence of drought may bring on these appearances; the observing farmer will understand when this change is caused by heat, or want of moisture, indeed he has to attend to the weather and the appearance of the approach of winter that he may take advantage of all the growing season, and at the same time not be too late in harvesting, and thereby expose the crop to be injured by frost. The roots should be pulled by hand or assisted by the spade when necessary, and the person that pulls them must shake the earth of them and be careful not to strike one against another or in any way bruise them; bruising has the same effect on beets that it has on apples, in both cases it disposes them to rot. The person who pulls the beets should cut off the tops with a knife, being careful not to cut the beet. The leaves being cut off lessens the disposition of the root to vegetate, and it prepares them to be housed. The beets should lay on the ground until they are dry before they are housed.

Preservation.—The roots must not be left long on the ground exposed to air, heat and moisture; much heat or cold are both found detrimental, as a heat of fifty-six to sixty degrees Fahrenheit, in damp weather, will produce a fermentation sufficient to reduce the quantity of saccharine matter, and on the other hand, beets freeze very readily, so that only a few degrees below thirty-two will dispose them to rot.

The best aired cellar is not better for securing the beet than a judiciously made pit, wherein the beets are stored and covered with the earth that was dug from the pit. The dimension of pits may be varied to suit circumstances. It is most prudent not to make them large, because if from any cause a part of the contents of a pit begins to spoil, the disease is contagious and will spread through the whole mass. They may be made from four to five feet wide, and eight, ten or twelve long. One to two feet is deep enough; this hole is to be filled with beets, and piled up until they form a ridge, and the whole is to be covered with the earth dug from the pit, a drain should be cut round the heap, to carry off all water, it being of importance, that the beet be kept dry, and for this reason, ground naturally dry should be selected for the pits—perhaps in our severe climate it may be necessary to spread a little straw or corn stalks on the outside of the heaps, to keep out frost; if put inside it might rot and spoil the beets, and it may be useful to open the pits from time to time to air and keep them fresh, and if any are observed to spoil, they should be carefully taken out. The preserving of beets is the most difficult of all the branches connected with them.

Growing of the seed.—As the beet is a biennial plant it is only in the second year that it produces seed. The proper time for choosing the roots from which the seed is to be produced next year is when taking up the crop; these should be healthy, somewhat above the medium size in length and thickness; well formed and no ways forked, and of a fine light color; (if for sugar perfectly white,) they should be kept through winter in sand or dry earth, and placed in a temperate barn or cellar equally guarded from the influence of heat and cold. In the neighborhood of Philadelphia, they should be planted out in March or so soon as the

land is in good order, and at the distance of two or three feet apart; this will be sufficient space for yielding the roots and leaves the requisite nourishment; the stalks will rise from three to five feet, and the branches being liable to split off, and break down, have to be supported by sticks or frames. When the seed is ripe, which will generally be in September, the said stalks are cut off, tied into bundles, and hung up, or laid over fences to dry—and then the seed is beaten off by switching the sheaves over a board set on its edge, or it may be thrashed. In France the seed is removed from the stems by hand, taking care too leave the small seeds that grow towards the outer end of the branches, as these seeds do not ripen well in that climate, which is moister than that of the United States. The next process is to expose the seed to the sun, and then it is put into sacks and kept in a dry place, where mice and vermin shall not have access to it. The average yield of plants in France is from four to six ounces of good seed. The beet in this country has been found to produce very good seed—it will therefore be prudent and a saving for farmers to raise enough for their own wants. And for some time, in all probability, it will be a profitable branch of business to raise some for sale.

General remarks.—The important uses to which the beet is now applied, having attracted great attention to its habits, it is found under some circumstances to degenerate; the seed of the white plant producing yellow and red roots; this tendency may be checked by changing the seed from clay to sandy, and from sandy to clay soils. Experience may show that changes from the north to the south, and from the south to the north, would be attended with good consequences. The seed, if carefully preserved from moisture, insects, and vermin, will keep for several years, but after four years it will not be prudent to sow it. When the object is to make sugar, care should be taken to have seed that will produce white roots, and early sowing will afford the opportunity of commencing the crushing and boiling at an early period. French writers on the subject inform us, that the early bruising produce the largest proportion of sugar. Some of their remarks on soil, it is difficult for Americans to understand, as in this country we have no chalk soil. The routine of crops where the beet is cultivated is very varied. Some French farmers plant potatoes the first year, beets the second, and clover the third—and repeat. Now we do not understand how clover can be made to follow beets, or how it could grow when sown amongst them, as it would be destroyed by the process of working the crop—but they may have an annual clover we are not acquainted with. Others sow beets two years in succession, oats the third, clover the fourth, and repeat. And one man is mentioned, who has sown beets with success, for fifteen years in succession on the same land; his practice was to change the nature and kind of manure and dressing put on the land.

In this country, as yet, there is nothing of strict system in the rotation of crops. The important article, Indian corn, grown all over the United States, and tobacco and cotton, in particular districts, renders it necessary for us, to adopt a system suited to our circumstances and resources; our farmers have to exercise their own judgment, and select practices suited to their particular positions.

In most instances, the beet crop will not be got off the land early enough to be followed by wheat, and late sown wheat in general is not a safe crop. Wheat is found to yield more grain with a less show of straw in those cases where manure is not directly applied to it, but to a previous crop. Where manure is immediately applied to wheat, it is more liable to mildew, than where it has been used to a preceding crop.

When the beet is employed in feeding cattle, one of the effects will be, to produce more and richer manure, and this will place in the farmer's power the entire command of his farm,—he can do with it whatever he pleases. Every encouragement is held out for the culture of beet. It being a green crop, draws much of its nourishment from the atmosphere, and in place of exhausting the land, leaves it in fine order, for any crop the farmer may choose to put on it. Beets in no way interfere with the cultivation of wheat, clover, barley, Indian corn, potatoes, turnips, &c. With the aid of a few beets, the profitable effects of that most useful grain, Indian corn, will be greatly increased in feeding cattle. Calves fed with beets or roots in their first winter, will generally be as good animals at the end of two years, as those that have been fed the first winter on dry food and corn, will be at the end of three years.

The raising a portion of beet is interesting to every farmer, inasmuch as the seed required to commence will put him to little expense, and afterwards he can supply himself; the business of his farm is the same as if he had planted an extra acre of potatoes, and the effects on milk, butter, cheese, fattening pigs, &c. is immediate. But on this crop, as in most new things, people will entertain different opinions; the merits of the question may be safely left to the decision of *self interest*, in a country where the people are fond of beef, butter, good meat and profit. The object of this paper is simply to furnish some information on the subject.

Although the intention of this paper is to call the attention of farmers, to the raising of beets, with a view to the improvement of their stock of cattle, their land, and their circumstances, it will not be out of place to draw their attention to another branch of the business of agriculture, that proves profitable to the husbandmen of other countries, and which is here more and more assuming an inviting appearance.

The best spermaceti oil, burnt in lamps, is now selling in Philadelphia at one dollar and fifty cents a gallon. The practice of using oil for lighting our houses, and its price, have for years been on the advance, and in consequence of the great number of whaling ships, the number of fish must be decreasing, and those that escape the fishermen, become more wary and shy. If oil in consequence of these *growing* causes, is so high in the seaboard towns, it will be higher in those of the interior, in proportion to the expense and hazard incident to transportation, therefore the farmer in these districts, has so much more inducement to raise the plants from which oil is made.

Most earnestly we recommend to farmers and planters, the growing of rape, which is a species of cabbage, or rather of greens, as it does not head. The French call it *colza*—and it is from the seed of this plant, that great quantities of oil are made by the French and English; and the former make

from poppy seed abundance of table oil, so good in quality that it answers all the purposes of olive oil, and is much cheaper.

Those who are acquainted with the cultivation of these plants, (the rape and poppy,) harvesting the seed, and making the oil, could confer great service on the country by publishing the processes, or such of them as they are acquainted with; and there is every reason to presume, the publishers of the "Farmers' Cabinet," published in Philadelphia, the "Cultivator" at Albany, the "American Farmer" at Baltimore, and the "Farmers' Register" at Petersburg, &c. &c., would give the communications a place in the columns of their very useful periodicals.

It is with farmers, as with manufacturers, merchants, and tradesmen of all descriptions; all are exposed to the fluctuations constantly operating on trade and commerce, influencing prices, supply, and consumption; and every one should observe the improvements that are made in the arts and sciences that relate to his particular business. For it is not to be disputed, that all other things being equal, those who are best informed, with the same extent of industry, are to be most successful: And while the manufacturer is diversifying his productions, and lessening the quantity of labor required to make them, the merchant is performing voyages in twenty-eight days, that formerly employed three months, and letters pass between New York and Liverpool with nearly the regularity of a well conducted mail coach, and go with greater speed. The farmer must exert himself also, or be laid under contribution to the more active; while he is neglecting to study the nature and qualities of soils, manures, the kind of grain, plants, and cattle best suited to his circumstances, the most effective manner of employing labor—and economizing time and every thing about him. The manufacturer is calling to his aid a stream of water, or steam engine, and with one or other of these agents, and the assistance of a few women or children, is converting bales of low priced raw cotton into costly cloths; or by employing a few steady men, iron ore into cart wheel tires, ploughs, needles, &c. &c., a few pounds of which will pay for the bale of cotton, barrel of wheat, or barrel of pork—nay, there are cases in which this will be done by a few ounces.

It is somewhat remarkable that there are few distinguished and celebrated farmers or planters, in comparison with tradesmen, engineers, and manufacturers. The truth is, the profession of husbandry, although it can be carried on in some way or other by most men, is one of the most intricate and diversified; influenced by causes, the laws of which are hardly known;—for example, of vegetation, the manner in which manure acts, the operation of lime, gypsum, &c. and the nature of soils, the grains and plants most suitable for soils and circumstances of the farmer, the seasons, the weather, the habits of plants, the nature, effects, and habits of insects, the grains, grasses, fruit trees, the adroit skill to secure the proper moment for sowing, harvesting, ploughing, and the innumerable operations and occurrences of a farm, influenced as they are by the vicissitudes of weather, and the talents to understand all that relates to these constantly operating causes, with the power to make the most of them, are more rarely concentrated in one person, than the knowledge and

capacity to be eminent in the other professions—this, and the diffused position of farmers, form some of the causes to which may be ascribed the circumstances of there being few pre-eminent farmers.

But it is evident that this all-important business has now entered upon a new epoch, and which is manifesting itself in more attention to the selecting of good seed, new articles of culture, whereby the rigors of winter are equalized with the food of summer—better breeds of cattle, and above all, by the number and excellence of the treatises and periodicals that are published in this country, and Great Britain, and to which every farmer should attend, and be especially careful to see that his sons read and reflect on the subjects they treat on.

J. R.

Philadelphia, January 1, 1840.

NUMBER OF SILK-WORMS' EGGS TO THE OUNCE.

Dandolo's statement of the number of silk-worms' eggs to the ounce is generally received as correct; and doubtless it was so, as stated by that very accurate experimentalist. But as there is no certainty whether the English translation of his work, which is from the French translation of the Italian, means the weights and measures of Milan, of France, or of England, the author's most correct statistics are rendered false, to our comprehension, or at least doubtful. According to this very incorrect translation, the number of eggs of the "common kind" of silk-worms to the ounce, is 39,168—and is therefore in round numbers generally estimated at 40,000.

Having ascertained by sufficient scrutiny that Dandolo's numbers, weights and measures, are falsified by the ignorance of his translators, (by their omitting to state when and what they have changed, and what left unchanged,) and considering that it was very important to know the true numbers of eggs to the ounce, we lately counted, with some careful assistants, the numbers that will be stated, and weighed them by very accurate scales and weights. The small weights (1 to 100 grains) were Professor Millington's, made for the nicest experiments, and the avoirdupois weights were new, of best quality, and tested by standard weights and found accurate beforehand. 437½ grains are equal to one ounce avoirdupois, by the comparison of these weights, as well as by rule.

No. 1.—2000 eggs of early crop of "hardy gray and white" silk-

worms weighed 24½ grains,
= 82 eggs to the grain, and
to the ounce, - - - - - 36,082

No. 2.—2235 eggs of same hatching, but another person's rearing, 25½ grains, = 86 eggs to the grain, and to the ounce - - 37,585

No. 3.—2690 eggs of same kind, but

also of a different person's rearing, 30½ grains, = 86 to the grain, and to the ounce - 37,582

No. 4.—1060 eggs of same kind, but of still another rearing, 12 grains, = 85 eggs to the grain, and to the ounce - - - - - 37,396

No. 5.—4000 eggs from a second brood in the same season, of a single female of the above, No. 1, (but all gray worms,) 47 grains, = 85 eggs to the grain, and the ounce - - - - - 37,234

No. 6.—4800 eggs of small "pea-nut" cocoon silk-worms, (Whitmarsh's stock,) 51 grains, = 94 to the grain, and to the ounce - - - - - 41,176

No. 7.—5000 eggs of "two-crop white" cocoon silk-worms, 52 grains, = 96 to the grain, and to the ounce - - - - - 42,066

No. 8.—1400 eggs of Tisam silk-worms, (a rare kind recently imported from China, which makes a large white cocoon,) weighed 15½ grains, = 90 eggs to the grain, and to the ounce - 39,516

It will be seen by the above statement, that there is a remarkable agreement of the weights of the samples of eggs numbered 2, 3, 4, and 5, and yet a considerable difference from them in No. 1, though from the same kind and stock of worms. This difference caused a mistake to be suspected, and therefore the first quantity (No. 1,) was counted and weighed a second time, and found correct.

SALE OF FLOWERS.

From the Newburyport Herald.

It appears from statistical information in the French Agricultural journals, that the land cultivated around Paris, as kitchen gardens, yields an amount of nearly eight millions of dollars, annually, and maintains half a million of persons. The flowers and fruit produced there, yield also several millions of francs. About two hundred flower gardeners reside at Paris and in the neighborhood, and supply the markets of the capital. There are days, especially the eves of grand fêtes, when the sale is very large. H. Hericart de Thury, affirms that on the 14th of August last, \$10,000 worth of flowers were sold in Paris, and that, in the depths of winter, certain grand soirées give rise to sales amounting to between 1,000 and 4,000 dollars. In the same season, bouquets of natural flowers are despatched, in tin boxes, not only to the remotest towns, but even to Munich, Vienna, and other distant foreign ports.

MISCELLANEOUS REMARKS AND SUGGESTIONS
ON ROOT CULTURE. EXPERIMENT IN FEED-
ING MANGEL WURZEL TO MILCH COWS.

Subject continued from p. 724, vol. VII.

To the Editor of the Farmers' Register.

I am induced, thus early, again to trespass on your columns, on the subject of roots, from various indications I perceive manifested by Virginia farmers to enter on their culture, and to test their merits. In the present comparatively improved state of agricultural science, and of the means now within the reach of every individual to obtain possession of the newlights the last ten years have disclosed, it would argue profound ignorance and neglect in not embracing one of the most obvious means of improvement, which has done so much for other countries, and must eventually produce the same results here. I am quite sure that no misgivings need be entertained about the climate. Nine years' steady culture, without a failure, in lat. 41, has convinced the writer of its excellence, and he thinks, on the whole, it is superior to either England or Scotland; and any where north of James river, and probably in the southern states, the same results may be obtained, regulating the time of sowing to the latitude. In my former communication on roots, was stated generally the mode of culture practised by the writer. He now proposes to offer some suggestions on the best mode of preparing the land for a crop of either turnips or mangel wurzel, time of sowing, the proper distance at which to drill the seed, selection of roots for seed, together with the result of an experiment in feeding mangel wurzel to milch cows, and some observations, which it is hoped may have a tendency to induce many of your numerous readers to become root growers. I am quite sure that no farmer can winter cattle with advantage without the aid of succulent food; nay, I will venture to add, that no man ought to be the owner of horned cattle or sheep in this rigorous climate, if he neglects to avail himself of this rich provision of nature's bounty, evidently designed by a kind providence for the comfort and health of the animal creation, and finally of mankind. Calves intended for steers scarcely ever recover from the effects of a five months' diet of straw and stalks. Let any individual select two spring calves of equal age and constitution—suffer one to run in the usual way, having as much sweet hay as can be eaten—give the other in addition to what hay will be consumed, half a bushel of turnips, the day from grass going to grass coming, or from 1st November to 1st May—and then, if the turnip-fed calf is not a year in advance of the other, with respect to condition, size, &c., and, moreover, delightful to look at, and creditable to the owner, then I will say that all my reasoning must be taken at a considerable discount.

In speaking of the turnips I wish to be understood as referring exclusively to the purple topped Swede, or ruta бага. Every other known variety (fifteen or sixteen in number) has been grown by the writer at one time or another, and finally rejected, and however useful some may be for early fall feeding of ewes and store cattle in the mild climate of Great Britain, they are utterly worthless here. Of beets there are many varieties, red, white, green, and blood-colored. The

white is the sugar beet of France; mangel wurzel is a hybrid beet, far superior for cattle to all the rest, and exhibits when cut transversely circular rings of red and white, very crisp, and grows very much out of the ground. This is the true kind, and well worthy of all care and of the best preparation. But to my subject. *Sod* is, or ought to be, with few exceptions, the foundation of every crop, and that is precisely what the turnip wants; on which I would haul, in the month of April, 15, 20, or 25 two-horse loads *long manure* per acre, according to the condition of the land, spread broadcast as evenly as possible, and then ploughed. If the manure was old or in a finely divided state, or what is commonly called short manure, the land should be evenly and deeply ploughed first, and then the manure applied, together with 40 bushels carbonated lime per acre. Turnips delight in a calcareous soil. Presuming the land to remain idle, no further working would be necessary, excepting weeds make their appearance more than common, until the 1st July in this latitude, the 10th for Virginia, when the spring furrow should be reversed, bringing the manure to the surface, (if under,) harrowed severely, and left until the time of sowing, which here ought not to be thought of until the 10th of July, or thereabout, just as you may be ready, 10 days later in Virginia, middle of June in New York state. Then let the ground be again harrowed, and proceed afterwards, as stated in your December number. If it is designed to apply concentrated manure in addition, let it be scattered or drilled along the small furrow on the ridge left by the couler of the drill, previous to passing the roller over. A light one-horse roller is here meant, six inches diameter, four feet long, taking two ridges at once; this is a very important operation, for, if the soil is not very compact about these small seeds, and dry weather follows, there is great risk of their coming up evenly. Independently however of that consideration, turnips delight to strike in a soil made tolerably solid. South of New York there is not the least necessity that the land should remain idle. A very valuable crop can be taken between April and July, ameliorating and cleansing in its nature. I mean the common field pea, white or gray, sown broadcast per acre; they will be off early in June, affording ample time for future operations. Twenty bushels per acre may reasonably be expected, which would defray all the expenses of the turnip crop. My turnip ground the past season afforded me a fine crop of oats cut green on the 20th June, and made into hay; but the roots being in full vigor gave me considerable trouble in preparing the land for the drill, so much indeed as deterred me from again pursuing the same course. Peas are the thing. The foregoing remarks apply to mangel wurzel, excepting the season of sowing, and that no previous crop can be obtained. The time for sowing in this latitude I believe to be about the 1st June; but take care to have them "any how," for they are a treasure. I have a word or two to say respecting the distance at which turnips and beets ought to be drilled. Any thing short of three feet will not answer, and even at that distance it is almost impossible to give them the requisite tillage, if the preparation is good. Twenty-seven inch-drills are very general in Norfolk and in Scotland; but in the United States, where the foliage on green crops is double in

amount, narrow intervals are inadmissible. Your excellent correspondent, J. M. G., esq., of F., thinks two feet ridges might do, "if straight." I will venture to add, that whether straight or crooked, whoever attempts it will soon discover the necessity of wider intervals. I have had the leaves of turnips to measure three feet frequently, before the bulk was much larger than a goose egg. If such plants were in two feet ridges what would become of them? Evidently enough, they would be smothered. The majority of green crop growers that I have seen in this state commit a fatal mistake in not paying due attention to the season for sowing. You may as well expect a crop of winter wheat sown in May, as a crop of turnips sown in this latitude the middle of June. People read of large crops grown in the north and in Europe, and sow accordingly, without reflecting, for a moment, in what part of this vast country they are. By sowing in July we can obtain as large and as handsome roots as can be produced in the other hemisphere sown in May. One of your subscribers, an excellent farmer, Mr. C. O—n of Princeton, in this state, harvested a most splendid crop the past season, many roots weighing 13 and 14 lbs. each, sown on the 7th July. (Allow me here to remark that the larger ruta бага turnips grow the better they are, provided they have small necks.) Other people's turnips again, near neighbors also, on land of similar formation and quality, who sowed in June, were worthless, and yet, notwithstanding this evidence of the impropriety of early sowing, many individuals, admirable executive farmers in other respects, persist in endeavoring to counteract the laws of nature. Finally, turnips sown early produce too much foliage, and soon after they have commenced bulging make an effort to seed, which is fatal to their future growth. From that moment the bulb ceases to grow, and the whole plant becomes fibrous, and comparatively worthless.

COTTON SEED.

From the Carolina Planter.

After the encomiums I have passed on cotton seed as a manure, you would hardly expect from me what I am going to say now—but a man may pay too dear for his whistle, though it be never so good a one. It is the practice of many planters to purchase cotton seed at high prices, for manure. It is said that 10 cents is as much as can be given for it to make oil of, and that the profit is not large at over 6 cents per bushel,—yet I have heard of planters giving as high as 20 cents a bushel, and then hauling it for manure. Fifteen cents is common, and 12½ considered, I believe, very reasonable.

Now let us enter into a few calculations. Supposing that a piece of land without manure would produce 12 bushels of corn per acre, it is a very fair allowance to suppose that with the assistance of cotton seed it will produce 20, or eight bushels more from the seed—I have not in general made more than five. If it will take fifty bushels to manure an acre, and to make this product it certainly must—the cost of the seed at 12½ cents per bushel, will be \$6 25. If it is purchased within five miles, the hauling and putting it on, both together, cannot be worth less than \$1 75—making the whole

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cost \$8 per acre. Now, in many parts of the country, an acre of excellent land may be purchased for \$8 and less—land that will bring more than 12 bushels of corn per acre. If the planter can sell his increase of 8 bushels of corn at \$1 per bushel, he will be just reimbursed for his expense in manuring, as the increase of fodder, peas, &c. will about pay him for the trouble of gathering, housing and selling the corn. But it will allow him no profit for his trouble and no interest on the money laid out. He would hardly be wise to continue the practice. But what planter can expect to get \$1 a bushel at this crib for corn every year? It has, like every thing else, been very high for a few years back—but at this moment the average price in the state cannot be more than 60 cents. I do not suppose that any planter would refuse to make a contract to sell for 20 years to come, what he makes to spare, at 62½ cents at the crib in cash. I would myself prefer raising corn at that price, to making cotton at 12½ cents—much prefer it. At 62½ cents the increase of 8 bushels of corn would be worth but \$5—Yet the planter has paid \$8 for the manure to produce it. The remaining \$3 he must expect to realize in the permanent improvement which his lands are to derive from the manure; but it is thought, as I have already mentioned, that little or no permanent advantage is derived from cotton seed, and that it is nearly absorbed by the first crop. Admitting, however, that it is improved, as I am free to say I think it is—and after ten years of successive manuring with cotton seed, it will produce the 20 bushels without manure for ever after—which, by-the-by, is an extravagant admission—at this rate his land will cost him first the original price, say \$10; next the \$3 per annum devoted for 10 years to permanent improvement, or \$30; and then the interest on each instalment of this sum compounded, which, at 7 per cent. would, of itself, amount to \$14—making the whole cost of the acre, at the end of ten years, fifty-four dollars.

Now, sir, for supposing me to be half right, would it not be better to purchase ready made land, of the rank of 20 bushels per acre at once? In what section of the plantation states would such land cost \$27, much less \$54. And do not those planters who pursue this course, while they are taking great credit to themselves for resuscitating their lands and enriching the state, really impoverish without benefiting any one except those who sell the seed. Are they good citizens who lay out on the acre of land \$54, or even \$27, that is not worth more than \$15 at the utmost, after that expenditure, thus actually sinking the balance to themselves and to the country. The period has not yet arrived for such a system of agriculture—when the density of population shall make land of this description worth from \$27 to \$54 per acre, and the permanently established price of provisions or cotton will enable its owner to make a fair profit on an investment at that rate—then cotton seed will be worth 12½ cents a bushel for manure, and not before. Then we can afford to buy manure—and, as the people do in Europe, send out into the highways to collect it—then we can use lime, and marl, and plaster of Paris, &c. &c., but until then, he who indulges in such extravagance beyond the limits of his garden or his turnip patch, is injuring himself, and so far injuring his country.

SHORT STAPLE.

POISONED CHEESE.

The following communication from Dr. Fansher appears in the *Hartford Courant*:—"I understand that a large family in Simsbury have been poisoned by eating cheese which came from New Orleans, of which every member of it perished; and having recently returned from a tour to the west, I have thought it my duty to state what I heard relative to the milk sickness districts, viz:—that the beef, butter and cheese, as well as the milk of the cows which feed in the woods, were deadly poisons to those who partook of them, and that persons in that region dare not make use of either; but that they are in the habit of sending what they dare not eat to New Orleans, where it is sold to merchants, who are not aware of the criminal fraud, and suspect not that they are dealing in a deadly poison."

CHEAP MANURING.

From the *Maine Cultivator*.

Many farmers in this state of late years have adopted the practice of manuring their land for wheat the ensuing season, by turning in green crops. For instance, take a field when the grass upon it is about fully grown, say the first of July, and turn it nicely over with the plough. Then harrow and sow with buckwheat. In four or five weeks, that is by the middle of August, this crop will have attained its growth. Turn this under with the plough, as you did the grass before. These two green crops thus ploughed under, bring to the soil much manure from the green haum acquired from the atmosphere. They create an active fermentation, make the soil light and pliable, and manure it more than if the same had been cut in the form of hay and fodder and given to horses and cattle in the barn. It is on the whole an excellent mode of enriching soils, which will ordinarily produce good wheat the next season.

THE DOMESTIC COCOONERY.

From the *Journal of the American Silk Society*.

It is expected that during the season of 1840, great numbers of persons will desire to try experiments in feeding silk worms, and to enable them to do so upon the most economical plan, we have prepared the following directions for fitting up and conducting a domestic cocoonery. Entire confidence may be placed in all the estimates and calculations, as they are founded upon the results of actual and judicious practice, both of European and American culturists. The editor of this *Journal* has been able to establish a set of simple principles or elements, deduced from the practice above alluded to, of numerous individuals, which will enable any person to make his calculations without difficulty, viz:

1st. The average weight of leaves that each *morus multicaulis* tree will afford during its season's growth on land of fair quality, and the trees planted four feet by one apart, is *one pound*.

2d. The average quantity of leaves consumed by each worm during its life, is *one ounce*.

3d. The space of shell occupied by the worms, is as follows:

During the 1st age, 1,000 worms occupy 1-3 of a square foot.
2d age, " " " 3-4 " "
3d age, " " " 2 square feet.
4th age, " " " 6 " "
5th age, " " " 18 " "

4th. Three thousand worms will make one bushel of cocoons.

5th. One bushel of cocoons will make one pound of raw silk, ready for market.

6th. One pound of cocoons will produce one ounce of eggs.

Thus, 1,000 trees will feed 16,000 worms the first year; these will require 288 square feet of shell, or 8 shelves, 12 feet long and 3 feet wide. They will produce $5\frac{1}{3}$ bushels of cocoons, or the same number of pounds of merchantable raw silk.

These simple elements, and all calculations founded on them, it must be borne in mind, refer exclusively to the *natural system*; that which all persons will practise in a domestic cocoonery.

Any common room may be used for the cocoonery. It ought, however, to have one or more windows on each side, and if it have a fire-place, it will be all the better for it. The second story of the house will be better for the worms than the first, though it is not so convenient for the attendants. If it be desired to fit it up temporarily for the cocoonery, the following plan will answer every purpose, without the least injury to the walls, or any thing else; and after the cocoons are gathered, the shelves can be removed, and the lumber used for other purposes.

Suppose the room to be 20 feet long, and 16 feet wide. Make three trestles, such as carpenters use, out of scantling, 3 feet long, one foot high, with four legs. Set one in the middle, and one near each end of one side of the room, and lay upon them 3 planks, 16 feet long and 1 foot wide; thus making a temporary table, 16 feet long and 3 feet wide. A tin-pan can be placed under each foot of the trestles, to be kept full of water to prevent ants and other vermin from getting upon the shelves. They can be obtained very cheaply at every tin-shop, and are effectual preventives of such evils. A second shelf may be placed upon the first, by fixing the trestles directly over those below, and a third, fourth, fifth and sixth in the same way. The trestles should be made to stand firmly and level, with the legs expanded, that they may act as braces to steady the range of shelves. The plank need not be nailed down, if it be an object not to injure them; but the shelves would be more steady and firm if this were done. In setting up these shelves, a space ought to be left between them and the wall, to prevent ants, &c. getting upon them from that quarter; a few inches will be sufficient. In a room of the above dimensions, then, we shall have three ranges of shelves, 16 feet long, 3 feet wide, with an alley of 3 feet between each range, &c. and a space at each end, to pass freely.

If we put 6 shelves in each range, we shall have 18 shelves, 16 by 3 feet each, and these will contain 48,000 worms. The plank shelves should be covered with old newspapers or any other waste paper.

The management of the silk worms on this plan, may be as follows: Expose the eggs to hatch in the usual manner. Pay no attention to those that hatch the first day. Those that hatch on the second day, should be placed on the first range of shelves; those that hatch on the third day, on the second range; and those that hatch on the fourth day, on the third range. Pay no attention to the few that hatch after the fourth day, they are too dilatory to be profitable. The young worms are very easily removed from the hatching table, by laying small mulberry leaves upon them, and when they attach themselves to them, take each leaf by the stem, and lay it on the shelf where you want the worms. Feed the young worms by laying on them a few fresh leaves four or five times a day, or oftener, if they consume them, or the leaves become wilted. During the first age, if the leaves are large, they may be torn, or cut into small pieces; but if you have plenty of leaves it is not necessary. After they have moulted the first time, lay on leaves, and when the worms become attached to them, lift them by the stems and lay them on a clean place on the shelf, allowing them about three times as much space as they occupied before. You may then clear off the shelf previously occupied by them. The same operation may be performed after the second, third and fourth moultings, extending the space they occupy each time, as in the first, and clearing off the litter in the same way.

In feeding the worms, from the beginning to the end, it is of importance that they be fed often and in small quantities. If you lay on too much food a considerable portion will be wasted; but that is the least consideration—the shelves will become loaded with rubbish, which will render it necessary to clear them often. We have always found it to be a good plan to keep the attendant continually feeding—always passing along the shelves with a basket of leaves, and whenever any of the worms are found without food, or nearly so, lay on a few leaves, and thus keeping them continually eating fresh leaves. We know it is the practice, almost universally, to feed at stated times—three times a day, or four, or five, and to weigh the leaves, giving at each feeding a certain quantity; but all our experience goes to prove its impropriety. Late at night a full supply of leaves, according to their age, ought to be given them, that they may have plenty during the night. Strange as it may appear, many persons suppose the worms do not eat much at night; the truth is, they eat rather more at night than in the day-time, as do all caterpillars; and they ought either to be fed occasionally during the night, or have a supply given them over night sufficient to last them till morning.

Wet leaves should not be given to silk worms, nor those having sand or dirt on them. If it cannot be avoided during long rains, necessity of course will compel the feeding with wet leaves; and generally this may do no harm; but I have seen very large quantities of worms destroyed by it. It should always be avoided, if possible.

The moulting of the worms will occur four times, but unless closely observed, and the several days' hatching have not been kept carefully separate, these changes will be scarcely noticed. The times of moulting vary, according to the treatment the worms receive. If fully fed, and a proper temper-

ature be kept in the room, they will moult about every 5 or 6 days; if a contrary practice be pursued, they may do so every 7, 8, or 9 days. If each day's hatching have been kept by themselves and they have all been properly fed, all the worms of one hatching will generally moult about the same time, and they should not be fed while they are in the moulting state. They generally remain in this state from 18 to 36 hours. As soon as they revive they should be fed as above directed, with large leaves, or even branches, and as soon as they attach themselves to the leaves, they should be removed to a clean shelf. It is frequently the case that only a part of them moult one day, and the balance the next. In this case the two moultings should be carried to separate shelves, and thus be kept separate in future, as they will otherwise not spin cocoons regularly. As the space occupied by the worms must necessarily be extended as the worms grow, the most convenient time for doing it is after each moulting. And if this be properly done, all the worms on each shelf can be made to spin at the same time, and thus save the attendant much inconvenience. To effect it all that is necessary is to separate the several days' hatchings, and at each moulting to collect all that revive at one time, and place them by themselves. Those who observe this precaution will be well paid for their attention.

After the fourth moulting, if you have plenty of trees, and do not care about the cuttings, you may cut off small branches with the leaves on, and lay them on the shelves. In feeding in this way, you can save much time, the leaves keep from wilting longer, and more worms can be accommodated on the same space. The branches should be laid first across the shelf, say six inches apart; at the next feeding they should be laid lengthwise of the shelf; and the next, crosswise again, and so on alternately crosswise and lengthwise at each feeding, so that the pile may form a mass of crib-work, affording a free passage for the air, and accommodation for the worms, into which they will descend, to form cocoons. The objections to this plan are, that in damp weather the mass of rubbish and dung of the worms, is apt to ferment, and thus produce disease; and also the loose tow of the cocoons is lost, as it becomes so filled with dirt and fragments of leaves, that it is not worth saving. It is believed, however, that the value of this tow is less than the trouble of the ordinary fixtures for the worms to spin on is worth. The writer of these remarks, raised his silk worms one season on this plan, and the cocoons produced were equal to any he ever raised. Care should be observed in feeding in this way, not to lay on so many branches as to raise the pile too high; as, if it approach near the bottom of the shelf above, before the worms are ready to spin, it will be very inconvenient to feed them. Not more than four or five courses of branches should be laid on each day, and the intermediate feedings should be with clear leaves, so that the pile may ascend not more than an inch and a half each day, and that the height of the pile on the shelf when the worms begin to spin may be about nine or ten inches. If, however, the pile should get too high, or if it gets damp and mouldy, the lower part can be easily removed by passing a couple of smooth sticks through the pile two or three layers below the worms; and by means of these, gently

raise the upper layers with the worms on, and remove all below. We found no difficulty in cleaning our shelves in this way.

During the whole time the worms are feeding, attention should be paid to cleanliness—that is, the room should be kept free from filth and bad smell. In very hot weather, the windows should be opened to give free air; and in cold damp weather, if it can be done, fire should be kept in the fire place. It is proper to observe, that unless the weather be very cold, no other injury will be done the worms than stopping their feeding and growth during its continuance. We have had weather so cold as to produce thin ice in our cocoonery, without other injury to the worms, than stopping their growth a few days, that is, it required two or three days longer to produce the cocoons than it would have done, had not the cold weather occurred. Therefore, though it is always better to keep the room moderately warm, by fire, if necessary, yet it is not indispensable to very fair success.

If disease occur in the worms, particularly the yellows, the best way is to take the sick worms from the shelves, and throw them away as soon as they are discovered. The yellows is both a contagious and hereditary disease; and hence, if one worm is attacked by it, it will be sure to be communicated to the others; and, worse than this, even if the sick worms get well, which they seldom do, the eggs they produce are almost certain to produce sickly worms, and, by this means, the crop of the succeeding year will be lost.

When it can be done, one or two days' supply of leaves should be gathered ahead, and kept in a cellar, that no damage may be sustained during rainy weather. But great caution should be observed not to feed with *wilted* leaves. It were better to give the worms wet leaves than wilted ones. If kept in a cellar and occasionally shook about, the leaves will keep three days in good condition. Where no cellar is at hand, and where you have plenty of trees, you can keep leaves fresh three or four days, by cutting off the tops and branches of the trees, and setting the but-ends in water. If the end of a branch be set in water one inch deep it will keep the leaves fresh. For this purpose, tubs might be used, and large quantities of leaves kept in this way.

The sun should never be allowed to shine on the worms; and if any of them are exposed to it, the window should be so shaded by shutters or blinds as to prevent it.

Successive crops may be fed, if it be desired to occupy the whole season, by keeping the eggs in an ice-house, and bringing out portions of them at each time of hatching. It is believed, that this is a much better plan than commencing with the whole at once. All new beginners should commence in the spring, with one-half an ounce of eggs, to be hatched as soon as the leaves put out. From the cocoons formed by this crop, eggs for next year's use should be saved, and reeler's should be taught. The very best cocoons should be selected to produce eggs. A ready calculation of the number required, can be made by dividing the number of eggs you want next year by 150. Thus, if you want 100,000 eggs next year, divide 100,000 by 150, and the result will be 667 cocoons required for eggs. Let these not only be the best cocoons, but be certain that they were the product of healthy worms. Attention to this is one of the

most important requirements of the art of silk making. And it is a matter of much regret, that it is not sufficiently attended to. Those who make a business of selling eggs, are too much in the habit of selecting their best cocoons for making sewing silk, and leave the rubbish cocoons, and those formed by sickly worms, merely for producing eggs—to sell, not to use themselves, for they know the value of them too well. Hence, in purchasing eggs, the utmost caution should be observed in obtaining assurance of their quality. The balance of the cocoons of the first crop, may be used in teaching the reeler to reel.

Many persons of course, have no ice-house in which to keep the eggs for successive crops. A very good substitute may be obtained in the use of a well.

A deep cold well will preserve the eggs from hatching as well as an ice house, if they are placed in it at the proper time. If access to the well be convenient, the best way is to descend to near the surface of the water, take out a few bricks or stones from the wall, so as to make a place large enough to contain the box containing the eggs, and place it there. If there be a pump in the well, the box will remain there securely. If not, of course, caution must be observed in drawing water, not to allow the bucket to interfere with the box; and the place prepared for it, should be on that side of the well least exposed to the dripping in drawing up water. It is also said, that a deep hole, say ten feet deep, dug in the ground in some shady place, the box of eggs placed at the bottom, and the top covered with plank, has preserved eggs in excellent condition. I have never tried this; but if the temperature in such a place be at or below 55° it will answer the purpose; the coldness of the place, no matter what place it may be, is all that is required. But as we have so often remarked, the eggs must be put in the cold place before the germ has commenced; if not, even the coldest ice-house will not prevent their hatching at or about the regular time in spring. The eggs ought to be put in the cold place during the winter, before they have been exposed to warm weather. If thus preserved, portions of them may be hatched at any time during the summer, and thus successive crops may be raised. The advantages of successive crops are these. A room that will only contain 48,000 worms at one time, can be made to accommodate that number *seven* times during the summer, by hatching a crop every three weeks, and keeping the young worms by themselves till the old ones spin their cocoons, and thus 336,000 may be raised during the summer. One person can attend to them, except occasionally, in clearing the shelves, when more help for an hour or two will be required. The person thus employed steadily through the season will become better acquainted with the business, than could be the case if only one crop were raised.

As soon as the worms have formed their cocoons, that is, *four days* after they begin to spin, the cocoons should be gathered, and the loose tow and filth stripped off as they are taken from the branches. The cocoons may then be reeled, or must be cured. The process of reeling, has been fully described in this Journal, and needs not be repeated here, as also has the process of curing the cocoons. Once more, however, let us urge upon all persons the propriety of reeling their own

cocoons. They will obtain several important advantages by it. They reduce the bulk of their product from a very large, to a very small compass—no small object to those who reside at a distance from market. They also obtain the profit of reeling, which is nearly or quite equal to that of producing the cocoons. Let no one for a moment indulge the idea that they cannot learn to reel silk. Any intelligent person can learn in a week or two, to perform the operation, and in one season, become sufficiently skilled, to produce the finest and best quality of raw silk. All who make the experiment of feeding worms, should appoint some active, intelligent young woman to reel, and the first cocoons made in the season, should be appropriated to her education as a reeler. She will become sufficiently expert with the cocoons of the first crop, to teach others with those of the second; and thus they will be able to reel the whole, nearly as fast as they are produced. This can be done, and should be done. Foreigners, we know, make a great noise about the difficulty of reeling; but we also know, that hundreds of American females have learned to reel in a few weeks, and produced silk equal to any ever produced in Piedmont. Indeed, we know of aged persons who have even *made the reel*, and learned to use it perfectly from the directions given in this Journal. Their only surprise was, after a fair trial, that any one should ever have invested the art with any difficulty. The extreme fineness of the fibre, to an inexperienced eye, seems to be beyond the reach of the sense of touch; and its apparent delicacy to the same observer, would seem to be incapable of withstanding the rapid winding off required in reeling. The fibre is so fine, that it can scarcely be seen, and so delicate, that it would be supposed to break at the slightest touch. Hence, every body on a first view supposes the art of reeling so very difficult. And yet all these difficulties vanish at the first fair trial; and all that is really necessary for a beginner is **RESOLUTION TO BEGIN**—let her take resolution to say “**I WILL,**” and she **SHALL** be a reeler. Reeling silk is much more appropriate to females than to males. The very delicacy of the fibre, and the lightness of the operation, indicate that the more delicate fingers of females should perform the operation. Let every experimenter in raising worms, therefore, also try the experiment of reeling, and in this way will reelers be created all over the country, and thus will a market for cocoons be established in every part of the United States.

The writer of this paper has already extended it to a greater length than he intended, or perhaps is advisable for the object. But he desired to say all that need be said on the subject, that the inexperienced reader, for whose use it is exclusively intended, might be able to try an experiment with all the advantage possible. Hence, many small things have been spoken of—trifles light as air to the practised eye—but none the less important to a successful experiment. As before remarked, this paper is intended for small domestic practice, not for large systematic cocooneries. The latter will undoubtedly build and fit up cocooneries expressly for the purpose; and for such, we have already published full and detailed directions. G. B. S.

ROCKY MOUNTAIN FLAX.

From the Albany Cultivator.

We know of no plant which seems to better deserve an effort for its introduction into the class of cultivated vegetation, than the one above named. The common flax plant is an annual; is exposed to the depredation of many insects; to get the full amount of the crop it is necessary it should be pulled, and yet with all these drawbacks, it is a valuable crop, and indispensable for many purposes. If a plant possessing the same valuable qualities as the common flax, yet which would be perennial, and could be cradled or mown at maturity—(thus giving an annual succession of crops from the same root)—could be discovered and brought into use among us, and particularly in the fertile valleys and prairies of the western states, the advantages would certainly be very great. Such a plant is the flax of the Rocky Mountains; and the individual or the society that shall introduce it into cultivation, should it answer present indications, will be considered as benefiting the agriculture of the country essentially. Of the various notices which we have seen of this plant, we select the following, as more particularly describing its appearance and the extent of its growth in those regions.

Mr. Parker, in his excellent narrative of his journey across the Rocky Mountains, from the Mississippi to the Pacific, says, “Flax is a spontaneous production of this country. In every thing, except that it is perennial, it resembles the flax that is cultivated in the United States—the stalk, the bowl, the seed, the blue flower, closed in the day time and open in the evening and morning. The Indians use it in making fishing nets. Fields of this flax might be managed by the husbandman in the same manner as meadows for hay. It would need to be mowed like grass; for the roots are too large, and run too deep in the earth, to be pulled as ours is; and an advantage that this would have, is, that there would be a saving of ploughing and sowing.” This was on a branch of Lewis or Snake river, of the Columbia.

In a late journal of a passage across these mountains by Mr. Oakley, of Illinois, under date of the 21st of July, 1839, occurs the following: “Encamped to-night in a beautiful valley, called Bayou Selard, 28 miles from the head of the south fork of the Platte. It is a level prairie, thirty miles long and three wide, and was covered with a thick growth of flax, which every year springs up spontaneously.”

Whether the Rocky Mountain flax will prove to be as near the common flax as is supposed by Mr. Parker, may be doubted; but that it is unlike and far superior, to the two or three kinds of native wild flax that have before been discovered in the United States, would also seem to be clear. A tract of 90 square miles of flax, such as Mr. Oakley described, would be a sight in any country, and would rival the grass covered prairies of Illinois.—

LARGE SEEDLING GRAPE RAISED BY VAN MONS.

A seedling grape vine, at Brussels, raised by Van Mons, produces fruit as large as a green gage plum, which, at the latest, ripens in the first

fortnight of August, and never fails. Its qualities are no less remarkable, as it is both solid and sweet.

SHORT HORNED CATTLE.

Never think of buying short horned or Durham cattle, until you are prepared to keep them well. They need an abundance of fresh pasture, and therefore to be frequently changed from one pasture to another, in succession, and plenty of food and good shelters in the winter. Thus provided for, they are valuable stock. But neglected in these respects, they are no better than native cattle.—*Franklin Farmer.*

CAPTURE OF A BEAR.

From the Bangor Democrat.

For the last twelve years, there has been residing within forty minutes' ride of this city, in the town of Brewer, near the "Big Pond," so called, a mischievous animal called a bear, of the hog species, with a brown proboscis, and short, but strongly sinewed legs; during which time, he has fattened upon the corn, cattle and sheep of the farmers who lived in his vicinity. During the past year alone, he has destroyed upwards of one hundred dollars' worth of stock, always taking care to secure his retreat when pursued, till within a few days, when he was accidentally discovered by some men who were employed in logging near the spot where he had taken quarters for the winter. Observing his tracks in the snow, they traced him to the mouth of his den, which was in the cavity of a ledge; when they commenced removing the brush he had carefully drawn into its mouth.

In a moment old Bruin began to snuff and growl, and made an attempt to take leg bail, but was saluted with a blow from a cudgel, cut for the purpose, and fell back into his domicile, where he quivered for a few moments, but suddenly regained his strength, and made good his escape for the time being. The next day he was hotly pursued by some half dozen of those on whose stock he had preyed, and the chase was continued for some five or six days, when Mr. Blood came to this city and informed some of our sportsmen (we have some old ones too,) who, accompanied by their hounds, immediately joined in the chase, and fifteen days from the time the bear was first started from his den by the loggers, (during the whole of which time he was hotly pursued by men and dogs, having been kept on the tramp the whole time, only excepting nights) he was captured and brought into this city by Capt. Nye, and Mr. Leonard Dow.

On examining him, thirteen balls were found to have pierced him; the last shots, however, were those which gave him his *quietus*—one of which took effect a little abait his fore shoulders, and the other near his spine. During the whole fifteen days, Mr. Blood, who is a farmer, kept open house, keeping all of those free of expense who were disposed to join in the chase, being determined to have the bear before he gave up. He weighed, when killed, three hundred and twenty-four pounds. The old hunters say he must have "run

off" one hundred pounds during the chase—but still he is a lusty fellow, and you Bostonians may prepare your mouths for a taste of his flesh, as I understand it is the intention of Mr. Dow to ship him at Frankfort for your city. He has been on exhibition in this city for the last two days, at 12½ cents a sight.

SPACES FOR SILK-WORMS. MISTAKES OF DANDOLO'S MEANING BY HIS TRANSLATORS.

There is no subject belonging to or connected with agriculture, which, for some years, has employed the pens of so many writers, or occupied so many pages, as instructions upon silk-culture. Besides the hundreds of particular communications from different individuals to various agricultural journals, and the dozen or so of other journals devoted exclusively to the diffusion of information upon silk-culture, there have issued from the American press, within a few years, at least ten several and long treatises, on this one subject. All these publications necessarily contain a great amount of useful facts and valuable instruction; but also, and of course, most of them have much that is either useless, or foolish, or false. There are many particular articles which we should rate very high in value. But, upon the whole, and as a general rule, admitting however of some considerable exceptions, it would seem that the utility and worth of these instructions are in the inverse ratio of their bulk and degree of pretension. It may be said in general that whatever the treatises in the most regular and systematic form have presented of value, was drawn from Dandolo, and the balance is good for nothing. It is much to be regretted, however, that all of the writers who have thus endeavored to copy Dandolo's rules, should have made some gross and great mistakes of his meaning (and doubtless of his language also, if that could be referred to,) so as to involve the whole of their instructions in error.

Arithmetical estimates and calculations are particularly adapted to the business and processes of the rearing of silk-worms; and accordingly they have been so applied very frequently and extensively by Dandolo, and by all his copyists, whether of those who blindly approve and aim to follow, or those who profess to condemn in many respects, and who yet no less blindly mistake their illustrious model and subject. And, as arithmetical calculations, if correctly founded and constructed, and correctly applied, furnish the best of all possible information and of reasoning on any subject, so errors or misapplications of arithmetic serve as much to sustain ignorance and falsehood.

Dandolo's treatise on the 'Art of Rearing Silk-worms,' even when seen in the existing imperfect and manifestly false English translation, (London edition, 1825,) is a work which deserves very high commendation. The practice of the author appears to have combined the accuracy of execution required for philosophical experiments, with a degree of success, and profit of results, which excelled the best of previous or general practical operations. And though, in our finer climate, we may safely and profitably omit much of the care and labor which Dandolo found necessary, still his rules and his facts are of great value for conveying general and correct information; and they form the best directions for practice in the occurrence of any of the difficult circumstances of climate under which he continually operated. If instructions are designed to suit the most favorable circumstances, they will be found wanting in every one of the numerous difficulties which *may* arise even in a generally successful rearing. But if directions are suited to meet the most difficult circumstances, they can be very easily omitted or slighted, when not strictly required.

Dandolo's work uses so much of arithmetic, that it may be considered as presenting fully the *statistics* of silk-worms and their management. For this alone it would be very valuable. But, unfortunately, the French translator from the original Italian work has misunderstood, and therefore mis-translated his author, in some of the most important arithmetical statements; and the errors so made, though as gross as any well could be, have passed, unquestioned and unsuspected, into the English translation, and thence into all the American treatises which have made use of Dandolo's, on what were thus improperly supposed to be his rules. And as the reader, after having been informed of the existence of such errors, cannot tell how far they extend, and whether any and each one of all the denominations and value of weights and measures has, or has not been, changed by either translator, and therefore cannot know whether it be Milanese, French or English, it follows that, even when correct, the stated quantities cannot be relied on as being what Dandolo designed. Hence one such falsely stated fact in twenty serves to render doubtful and destroy the value of the other nineteen, even though they may be truly stated.

The principal and most obvious mistake to which allusion is here made is the mis-statement of the spaces required by silk-worms in their different ages. Not having been able yet to obtain the original work, we are unable to know certainly and precisely what Dandolo himself meant in this respect, either as to the actual denomination of

measure, or the number of such measures; but, in the absence of the direct proof which the original work might furnish, there is abundant testimony furnished even by the copyists themselves, that they are totally mistaken as to the meaning of the original, which they have perverted to a ridiculous extent of error, without one of them suspecting it.

The first treatise published in this country was the 'Manual,' compiled by order of the secretary of the treasury, under authority of a resolution of the house of representatives. If the compiler had simply translated and given Dandolo's treatise—or if he had merely copied the existing English translation, with all its errors—he would have done good service. But while taking nearly all his matter from Dandolo, or from his translators, there is thrown in, and without being distinguished, just enough matter of his own, or of others, to damage and discredit the whole. Yet the compiler stated in his preface, that he, "having the use of the original work in Italian, as well as the French translation from which the English version was made, *the errors of the latter were corrected.*" If this was, indeed, done in any important particular, we have not discovered it; and it will be shown, that in the main one above mentioned, the grossest and most obvious errors of both previous translators have been faithfully and fully retained. Thus, instead of directing so many *square feet* of space for certain numbers of silk-worms, the American writer most carefully and studiously, and over and over again, uses the words "*feet square.*" The absurdity of this error ought to have been enough to expose it; but the compiler stuck to it, through the whole writing and printing of his book. It was only after every sheet of the work had been printed, that it seems *some body* first suspected this great and general mistake, pervading and affecting the whole of the calculations and rules, and put it as a *general* erratum in the supplementary list of errors, thus: "In page 175, last line, for '*feet square*' read *square feet.*" In other places, the same correction to be made." And this correction is necessary in so many "other places" of the book, that it is certain that the writer had not even suspected his mistake; and neither has his supplementary "erratum" been seen by any of his followers. For others have copied the mistake from the 'Manual' just as heedlessly as the compiler of that work did from a preceding blunderer. We will give a single example of the enormous absurdity of the mistake. The space required for the accommodation of the worms from one ounce of eggs, in their 5th age, is stated to be "one hundred and eighty-three feet four inches *square.*" This is the

square of the number, instead of the number itself of square feet, and is equal to 33,612 square feet, or a surface of feeding shelves, of more than three-quarters of an acre! And yet, obvious as is this error, it is faithfully copied from the English translation, and has been as faithfully re-copied by nearly all the subsequent American authors or compilers.

Clarke, the author of the latest American treatise, (1839,) and the volume of greatest size and most pretension of all, objects to Dandolo's spaces, (or, as we say, those of Dandolo's translator,) as being too small. But he is content however to increase them merely by changing the fractional parts, or the odd inches, to the next greater whole number of feet. With this very slight addition, he constructs and presents a table of his own, upon the same grounds, showing the "feet square" requisite on the shelves, for worms proceeding from "one ounce of eggs and every intermediate quantity to 10 ounces. Thus, the worms from 10 ounces, in their last age, as stated in this carefully constructed table, require 1840 "feet square;" which would be equal to 77 acres of surface of shelves!!!

But after throwing out this greatest and most glaring of errors, and supposing the *square feet*, and not the *feet square*, to be understood by all, (their words to the contrary notwithstanding,) there still remains another great error in this estimate, which can be very clearly shown to exist, although, without reference to the original, we cannot do more than infer the true sum.

According to the 'Manual,' (which in this respect copies literally the English translation of the French translation of Dandolo, and which is again copied either precisely, or very nearly, in half a dozen American regular treatises,) the "spaces occupied by worms in different ages" are as follows:

"The worms proceeding from an ounce of eggs should have a space,

In the first age, of 7 feet 4 inches square—
" second 14 feet 8 inches square—
" third 34 feet 10 inches square—
" fourth 82 feet 6 inches square—
" fifth 183 feet 4 inches square."

Now after making the change of these numbers of "feet square" to square feet, (all the correction that the authors *can possibly* claim,) the spaces are still altogether erroneous, and much too small; and if these oft-repeated rules have indeed directed the practice of any young culturist, we undertake to say that he either killed or greatly injured his worms, by their being too much crowded on the shelves.

In Brewster's 'Journal of Science,' there is an article by Murray, which is manifestly founded on

Dandolo's work, and operations, and on Murray's personal observation on silk-culture in Italy. (See Brewster's Edinburgh Encyclopædia, art. Silk.) In this he states the spaces required at each different age, and no doubt he gave the very spaces prescribed by and learned from Dandolo. Now these spaces are not stated *by the foot*, but by the Italian measure "*braccio*," which Murray says is "about 22 English inches." Thus he states the spaces required by the worms from an ounce of eggs to be as follows:

During the first age,	4 square braccia,
" second age,	8 do.
" third age,	19 do.
" fourth age,	45 do.
" fifth age,	100 do.

The translator of Dandolo, it is obvious, reduced the lineal braccio to feet, and so the squares of the feet were substituted, for the squares of the equivalent in length, in the Italian denomination, although the result is thereby made altogether different. As there has been so much misunderstanding on this point, I will annex a figure which may be clearly understood, even by all of Dandolo's translators and copyists. It is manifest from these figures that, though 4 braccia, in length, is the same as 7 feet 4 inches, in length, that 4 square braccia is very nearly twice as much space as 7 square feet and one-third.*

Four	square	brac	cia.
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Four braccia, lineal measure, equal to 7 feet and four inches.

Seven	sq're.	feet	and	a	third.
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Seven feet and four inches square.

* We take as correct Murray's value of the *braccio*, because he doubtless received it from Dandolo, and in the locality where used, and also because 4 braccia in

Now, having ascertained what were Dandolo's prescribed spaces, let us state them in American square feet, opposite the amount of square feet as falsely rendered by his translators, and received, and copied by the 'Manual' and its followers.

Spaces required by the worms from an ounce of eggs.

	Braccia	sq. in.	sq. ft.	sq. in.	English translation of Dandolo and American copyists.	*7 ft. 4 in. sq.
In first age,	4	= 1936	= 13	64		
second age,	8	3372	26	128	14	8
third age,	19	9196	63	24	34	6
fourth age,	45	21780	151	36	82	6
fifth age,	100	48400	336	16	183	4

Dandolo says that the number of eggs of the common silk-worm in an ounce, is 39,168. (By the way, the value of his ounce is made even more uncertain than that of his foot measure.) He elsewhere supposes that 120 lbs. of cocoons from an ounce of eggs is a very good product, though he also says that if all the eggs were to produce cocoons, there would be 163 lbs. from the ounce of eggs. This shows that he counts on a loss of worms (or eggs) in the ratio of 10,288 to the ounce, and leaving only 28,288 worms to reach maturity from each ounce of eggs. Therefore, upon these data, the number of worms to each foot square would be as follows:

According to Dandolo's statement (as supposed to be restored above) if all the 39,168 worms lived, or 336 square feet = to the square foot - - - - - 116 worms.

But if 28,880 only lived, then to the square foot - - - - - 92

According to correction of translators and copyists, if all lived, - - - 214

And if 28,880 only lived, - - - 158

Thus, the generally received statements of spaces, if explained to be in "square feet," would be as ruinously small, as they are ridiculously large, in "feet square," as worded.

As we presume that none of the copyists of Dandolo's translators, when brought to the question, will adhere to their spaces in "feet-square," they must at least abide by the same numbers in

length, of "about" 22 inches, agree very closely with the translators' "7 feet four inches," linear measure, though not when squared. But for this authority for, and mode of estimating the value of the braccio, it would be a difficult matter to fix it; as the braccio is of different length at Milan, Florence, Mantua, Reggio and Rimini, and every one of them is different from Murray's statement. See art. "Measures," in Rees' Cyclopaedia.

* The amounts stated in this column are as at page 203 of the English translation. Elsewhere, they are given with slight differences, and so there are these and sometimes other slight differences in American treatises, but nothing that is material, or that shows any suspicion of the general and great error.

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square-feet; which will serve only for the numbers of worms stated above. It is manifest that, if so crowded as either of the two last numbers require, all the worms would perish. We should fear to crowd even as the correction of Dandolo's spaces allows. But those greatly exceed the spaces received and repeated by the others. Mr. McLean thinks that 62 worms to the square foot, in their last age, are as many as should be suffered; and Mr. G. B. Smith advises still fewer. In the little treatise by the latter, which first appeared in vol. 6 of Farmers' Register, he stated, rather indefinitely indeed, that his hurdles "are from two and a half to three feet wide, and four to five feet long," and that "the size mentioned will accommodate 500 worms, when ready to spin cocoons;" and in his last number of the 'Journal of the Silk Society,' (issued since this piece was written) he states, precisely, that 1000 worms in their last age require 18 square feet, which is 55 or 56 to the square foot.

These writers are practical feeders, and neither of them would have copied the estimate allowing 214 nor even 158 worms to the square foot, because they so found it in the mistranslation of Dandolo. A more fatal error could not be inculcated than this one, which has passed, without correction or consideration, from the first American treatise, the Congress 'Manual,' to the latest, which Clarke sent forth in the last year, and which is the most voluminous, the most pretending, the most ambitious and pedantic, and, for its pretensions, decidedly the most empty of all. The author quotes Latin, Greek and French, and it is a pity that his learning did not extend to Italian; for then, instead of copying the errors of Dandolo's translator, he might have corrected the errors by reading and quoting the original.

Morin's French "Manuel," from which was translated the "Directions for feeding Silk-worms" published in the 6th volume of Farmers' Register, (commencing page 464,) like most other treatises, is but Dandolo's in another form. This we did not know when we made that translation, having then never met with the translation of Dandolo. Still, though having the same form of words to follow, and to be misled by, in our translation, the several measures of space first were rendered as "square feet," and not as "feet square." This was as near the truth as a mere translator could approach—inasmuch as the author translated has the general erroneously stated denomination of feet and inches as well as of numbers.

By the way, we were not aware, until after this article had been written, that another American translation of Morin's Manuel had been made, and that too earlier than our own. It was published in Boston in 1836. We have only examined it so far as to see that this also falls into the

usual and greater error of "feet square." Thus, in like manner as elsewhere, at page 77, it says that for the brood from 5 oz. of eggs, in the 4th age, "the space which the worms must occupy is 412 feet square"—which is more than 4 acres space of shelves, when the worms are not half grown, or will require twice as much space when fully grown.

In D'Homergue's recent volume on silk-culture, we expected to find that he, at least, as a foreigner, from a silk region, and professing to be entirely acquainted with the subject, would discover and expose the errors of Dandolo's earlier translators and their copyists. But his treatise is, like several others, almost a copy of the translators; and this gross error of space was not even suspected by him. It is true that in most places he directs "square feet" instead of "feet square." But in that he has merely fallen into one error instead of the other. Moreover, in one place, he takes the opposite and greater error, and gives his directions so explicitly and fully, that the error cannot be ascribed to inadvertence. At page 69, he says, "Fourteen feet eight inches square of table or wicker hurdles are needed for the accommodation of the worms from one ounce of eggs, until the accomplishment of the second moulting." And by his elsewhere, as to the after ages, stating "square-feet" instead of "feet square," it only shows that he went not only into one, but into both of these great and opposite mistakes, and without suspecting the existence of either of them.

WORKING COWS.

From the Maine Farmer.

Some people are strong advocates for working cows in the same manner that we do oxen. We have once or twice expressed ourselves opposed to this, inasmuch as we think that the cow has enough to do to attend to the dairy, and to impose the burdens of the yoke upon her, too, is requiring a double duty.

We are however willing that facts should be known. We have no doubt that the cow is very kind and patient in the yoke, for we have seen them in that situation, and know that they did well. In conversation with Mr. Francis Wingate, of Hallowell, the other day, upon this subject he gave us the following narrative.

A Mr. Hoyt, of Amesbury, Mass., many years ago, was in the constant habit of working his cows. He was a small farmer, having about twenty-five acres of land, which, with the aid of his two cows, he cultivated well, and obtained a good living for himself and family. His mode of operation was as follows—He usually obtained the help of a stronger team for breaking up and other heavy operations, but the ordinary work he did with his cows. He worked them about three hours early in the morning, and then let them lie by until three o'clock in the afternoon, when he worked them three hours

more. When at work he kept them more generously than common, and he invariably milked them *three* times per day. It was a common remark that they afforded more butter and cheese than any other two cows in the town. If it should prove true that cows in general may be worked, say six hours during a summer's day, and by the help of a little extra keep, afford as much or more milk and butter than if not worked and ordinarily kept, there certainly is a saving to work them.

We are not so very strongly opposed to the system as to be blind to facts, and if experiment, fairly tried, shall prove it to be both economical and profitable, we should recommend it.

A good staunch yoke of oxen suits our ideas of a team better than any thing else, but there are many who are not able to own such a team, and the time spent in running round to hire often makes quite a tax to those who are under the necessity of doing it. If such persons can get up a cow team, and not abridge their supply of cream, it may prove a convenience to them. It is worth a careful trial.

HAY TEA FOR SWINE.

From the New England Farmer.

To Elias Phinney, Esq.:—I should not thus publicly have called upon you for any information which your long experience in swine breeding might suggest, but for the fact that your liberality is no less proverbial than is your opinion in these matters worthy of credit.

Within the last two or three years, I have bred and raised a considerable number of hogs, but, until within the last few months, I have been among the unbelievers touching "improved breeds" so called, and which are now circulating so much more generally than heretofore in our country. In September last, my attention was arrested by the pictorial representation of a Berkshire hog, at the head and advertisement in one of our agricultural publications—the picture of which pleased me so much that I determined forthwith to try them. I purchased at your establishment two sows of your favorite and well known Berkshire and Mackay cross—I obtained a pair of Chinese sows out of imported stock—my Berkshires were from the stock of Caleb N. Bement and others—and in the early part of November last, my establishment consisted in part of fifteen breeding sows of the Berkshire, Chinese, Berkshire and Mackay, and other crosses, together with two Berkshire boars, and one large Mackay, Berkshire and Mocha boar. As occasion presented, I tried various experiments with these animals, and, in most cases, was pleased with the results.

Towards the latter part of December, 1839, a work entitled the "*American Swine Breeder*" was published. Amongst the variety of articles recommended therein as food for swine, I noticed that a "Mr. Saunders, of Stroud, Gloucestershire, Eng., had made use of hay tea with much success." This gentleman "fed a stock of four hundred head of hogs, and in the course of his experiments used some 1500 hogsheads of the wash—maintained them at the very low rate of one penny per day—many of them were fit for the butcher," &c. &c. Economy in the food for swine being among the first considerations with me, I forthwith adopted

the use of *hay tea*. The kinds of hay recommended were, "clover, sanfoin, and meadow hay." I purchased a small quantity of each, and commenced the experiment. In the outset I used clover *alone*. I then used herdsgras, but did *not* use any of the meadow hay. Instead of using clear water, (as I had been used to do,) I mixed the food with hay tea (made after the directions advised in the work above named,) and fed it out in all respects as I had done previously, indiscriminately to breeders, store hogs, shoats, pigs and all. The tea was made not simply by my direction, or under my supervision, but by my own hands.

"It deserves particular attention," says Mr. Saunders, "that in a week or fortnight after I commenced the experiment, the pigs improved in their coats, which, from looking coarse, assumed a gloss, and became fine and short, a *proof*, surely, of the great nutrition of the food, and of its perfectly agreeing with the hogs," &c.

It deserves particular attention, (*say I*), that in a week or fortnight after I commenced the experiment, the pigs *did not* improve in their coats, or in any wise whatsoever—"a *proof*, surely," at least, that "the great nutrition of the food" exhibited itself rather differently in the case of Mr. Saunders, than it did in mine, as the sequel will show.

From the first week after I commenced using hay tea—breeders, shoats, and pigs—all began to decline. My large sows were all with pig, and some of them considerably advanced in pregnancy. I took the usual precaution, and commenced physicking—still feeding them on food mixed with hay tea, however, (not suspecting evil *then*), but, despite of all my care, two of my Berkshires "popped off." Upon opening them, I found the lower intestines completely clogged, the lungs spotted and inflamed, and upon the liver appeared small bile or pustules. Still I did not charge it to the hay tea, and still I fed them as before. My Chinese sow, *Blue Belle*, suddenly looked languid, and, for a meal or two, refused to eat. I changed her food and mixed a dish of meal, well warmed, with a portion of salts and sulphur, which I placed before her. She would not eat. She was in the sixteenth week of her pregnancy, and being very heavy, I did not attempt forcing any thing down her throat, lest I should kill her young, and thereby, probably, lose the mother. I accordingly left her to herself, in a dry, warm pen, for the night, and in the morning found her dead. I opened her, and found her lungs and liver affected, as was the case with the others, but particularly like those mentioned before, with regard to the intestines—the latter being, as it were, *tied up into knots*—so badly clogged as they were. Here was also a loss of *twelve* pigs, out of as fine a Berkshire boar as can be found in the state. Still, I did not attribute it to *hay tea*.

Heretofore, my hogs had been fed upon squashes, potatoes, and my refuse cabbages, beets, carrots, &c., together with an occasional mixture of ruta baga and house offal, all of which was thoroughly boiled and mixed before being fed to them. These kinds of food having become exhausted, I commenced more lately with ruta baga and sugar beets, (an equal quantity of each,) boiled together, mashed and mixed up with the hay tea—prepared as before. A pair of fine sows, of the Berkshire and Mocha breed, showed symptoms which led me to fear that they were to be the next victims.—I physicked them thoroughly, but to no purpose;

one died, the other I killed, *to save its life*—or rather its pork. The choice Mackay sow I purchased at your establishment last fall, next refused her food. She was exceedingly fat, and I gave her the knife in season to prevent her dying of her own accord. I will here remark that *all of these* were affected precisely like those which died first, except that in these last cases, the *livers* appeared very much worse than did those of the first, being in two cases *completely covered* with these hard, viscous looking bile, which must necessarily have destroyed them in a day or too longer, had they been left to themselves.

A young boar, out of a fine grass sow in my possession last summer, promised well, and I purposed raising him, for his stock. At three months and a half old he shared the same fate with the rest, from the same cause, if I could judge from the symptoms exhibited during his sickness. It appeared that, uniformly, the pigs died within forty-eight hours after the first signs of indisposition. In this last case I had the boar placed alone, in a new floored pen, where I could watch the effect of medicine upon him. He would not swallow voluntarily, and I prepared a dose of castor oil and sulphur, which I forced down his throat at night. In the morning I could find no proof that the physic had operated, and accordingly I had him tied up and poured about a gill of lamp oil down his throat. After waiting eight hours and finding it produced no effect, but that he still declined and had become rather stupid, I bled him in the feet, which for a while revived him. Towards evening, as a last resort, I attempted the use of *mercury*. Having obtained four pills of ordinary size, I mashed them and tried to force them into his stomach; it was *no go*, however. We tied him up again, but he appeared in great pain, and died before we could get the last dose into his mouth. Upon examination, I found his intestines knotted as in the previous cases, and not a particle of the medicine administered the day previous, had passed these knots.

"*Blind Nancy*," my oldest and best breeding sow, (originally from your establishment,) of the Berkshire, Mackay and Mocha breed, gave me eleven pigs on the 22d of December last, ten of which I found *dead* in her pen. Whether they were born alive or not, I am unable to say, but I am inclined to think they were not, as the last one lived only about an hour after its birth. Nine of these pigs had been purchased by different gentlemen in my neighborhood, at \$10 each, "to arrive." This animal being a very superior one, I felt anxious to save; and of course spared no care or attention necessary to effect it. I had the satisfaction to find that she experienced very little apparent inconvenience from the loss of her fine brood, but, on the contrary, did well after her *accouchement*, upon a slight allowance of *dry* food. In ten days afterward, I commenced feeding her as before, upon vegetables mixed with hay tea. On the 11th of the present month, she left her food in the trough, for the first time since I owned her, (being naturally a very hearty feeder,) and began to act suspiciously. I tried physic again, but to no effect, and fearing to run the risk, after losing so many, I placed her most reluctantly in the hands of the butcher. Her lungs were uncommonly *purple*, and her lower intestines were in the same condition as we had found the others.

My Chinese sow "*Plentiful*"—a fine breeder, from stock originally imported into Salem—on the 15th of this month, dropped twelve pigs (out of my Berkshire boar) every one of which *came* dead! and from present appearances, I fear the mother will soon follow.

Thus you see, sir, I have met with several severe losses, and I cannot conceive but *the cause* of all these misfortunes is the same. The object, therefore, of this communication is *not* to assert that hay tea has killed my hogs, (although I have abandoned the use of it, at least, for the present,) but simply to state facts, and inquire of you, whose opinion in regard to this subject will be authority, whether or not it is probable that the astringent powers of the article herein named (hay tea) are such as would produce these disastrous results, and, if not, what the cause can be, judging, as we only can, from the symptoms produced previously to, and the condition we find the body in after death.

Your opinion will greatly oblige one at least, and I doubt not that it will be thankfully received by all the readers of the Farmer.

I have the honor to be,

Your obt' servant,

GEORGE P. BURNHAM.

Roxbury, Mass., Jan. 20, 1840.

BEST FORM OF A COCOONERY.

From the Journal of the American Silk Society.

We are frequently called upon for our opinion of the best form of a cocoonery. After much reflection, and consultation with men of experience on the subject, we have arrived at the conclusion that the best form, under all circumstances, is that of a rope-walk; that is, long and narrow, wide enough for two rows of shelves one story high, and as long as may be required to accommodate the number of worms required. In this form, in places where lumber is plenty, it can be constructed very cheaply. The roof and weather boarding can be supplied with slabs, and the frame may be made of very light timber; and the whole work could be done by a very rough carpenter. The shelves should be about three feet wide, with a four feet passage between them, and a three feet passage between them and the walls. Cross-passages three feet wide should also be provided, at distances that might be indicated by the length of the plank out of which the shelves are formed: thus, if the plank be fifteen feet long, then the cross passages would occur every fifteen feet, or in other words the shelves should be fifteen feet long, and an interval of three feet between each range of shelves. The shelves should also be convenient as to height; they ought not to be higher than can be conveniently reached and attended to by the attendants; and hence, five shelves one foot apart will probably be the most convenient number as to height. A cocoonery upon this plan will accommodate 12,500 worms to each range of fifteen feet shelves; or every eighteen feet of the cocoonery will accommodate 25,000 worms; and seventy-two feet long will accommodate 100,000 worms. We will remark here, that our allowance of space for the worms is very liberal; but as it is of great advantage to the worms to be allowed plenty of

space, it is deemed best to allow them, as above indicated, nearly a square foot to 50 worms. There are many conveniences and advantages attending this plan. The shelves are more convenient of access; the light from either side operates equally on all the shelves; while on the old plan, the outside shelves receive too much light, and the centre ones too little. In case of contagious disease attacking any portion of the worms, they can be more readily separated from the others, and the air in the room is not so liable to become foul. The cocoonery can be built in the midst of the mulberry trees, and the leaves can be carried into it through the doors in any part of its whole length. Windows should be made at every nine feet, so that each range of shelves shall have two opposite to it; and doors should be opened at convenient distances in the sides, and one at each end opposite the middle passage. The windows and doors should be made to close tightly, that the light may be partially, and the cold and damp air entirely excluded, when necessary. If stoves or fire-places be provided, to guard against cold and damp air, it will be a great advantage in bad weather, and the careful attendant will realize the more profit from his labors. But in the middle and southern states fire will seldom be necessary, especially after the first crop of the season.

Many persons have too many shelves in the range, thus making it difficult to feed on or clean the upper ones. The attendants must either carry stepping-stools with them, or place their feet on the lower shelf to enable them to reach the upper shelves, thus often crushing worms, injuring the shelves, and at last attending the upper shelves very imperfectly. It would be better economy, we think, to erect the range of shelves only as high as above indicated. The site of the cocoonery should be high, as it of course will be if the trees are growing on *their* proper situation.

The costly buildings and fixtures so often described, that have been erected, and recommended as patterns, are, in our view, worthy of any thing but imitation. All that is required by silk worms, are proper food, shelter, and protection from the inclemency of the weather and the sun, and from vermin; no matter how simple or cheap the building may be, if it accomplish this, it is all that is required.

G. B. S.

GREAT WALL OF CHINA.

From the New England Farmer.

Even when united under one emperor, China trembled at the Tartars of the desert. About two centuries before the birth of Christ, She-hwang-te (the brook-burner,) constructed the great wall of China, to prevent their incursions. The wall, which has always been considered one of the world's wonders, is 1500 miles in length, of great height and thickness, furnished with fortresses and towers innumerable, and is carried with singular skill over mountains and rivers, as well as across the plains and valleys. Lord Macartney exclaimed on seeing it that it was certainly the most stupendous work of human hands, and he rationally concluded that at the remote period of its building, China must have been a very powerful and civilized empire. Dr. Johnson was accustomed to say of it, that it would be an honor to any man to

say that his grandfather had seen the great wall of China. Mr. Barrow, who saw it with Macartney, went into some amusing calculations as to the quantity of the materials it contains. According to his account, all the materials of all the dwelling houses of England and Scotland, supposing them at that period (at the end of the last century) to amount to 1,800,000, and to average 2,000 cubic feet of brick work or masonry, would be barely equivalent to the bulk of the wall, without taking in its fortresses or towers, which he calculated contained as much masonry and brick work as London did at that time. Stupendous as was the work, it failed in its object.

ON MAKING GOOD BACON.

From the Agriculturist.

The beginning of a year is generally the time for putting up pork for bacon; as this is a standing dish in the west, I have concluded to give you the result of thirty years' experience upon this important subject. The first thing necessary to make good bacon is to have fat hogs—slaughter them in the beginning of the week, so that you can take care of the offal before Saturday night; otherwise, if a warm day or two should intervene, part of it may be lost. It is highly important that hogs slaughtered for bacon, should be well bled—the more completely the vessels are emptied of blood, the less disposition there is in meat to taint or putrefy. As soon as the hog is well cleaned and hung up, it should be freely washed with warm water, wiped with a towel and carefully scraped with a sharp knife, especially the head, ears and feet, if you wish to have good souce or hogs-head-cheese. These parts are generally neglected, and thrown by "for a more convenient season," and then taken up by the cook or some idle chap about the establishment, and the hair singed off, and the shin burned until it becomes black and bitter, thereby imparting its color and taste to the souce and hogs-head-cheese. After gutting the hog, the inside should be carefully and freely washed with cold water, with the mouth open, so that the whole may pass through the throat, and remain in this condition until completely cool, which will generally take place, even in moderate weather, in one night. If the weather should be so mild that it will not cool in one night, it had better be cut up, and spread upon brick and stone pavements, previously wet with cold water; if the meat is still soft, dash cold water upon it, and it will soon be ready for the salt, but in all cases it should be perfectly cool if practicable. In one or two instances I have made as good bacon as I have ever made, out of meat frozen so hard that it had to be cut up entirely with an axe. As to the mode of salting and the quantity of salt necessary to cure pork, so as to make good bacon, every man thinks he knows better than his neighbor. I have experimented for the purpose of ascertaining the best mode of salting down pork, as also the proper quantity of salt and other ingredients, such as sugar, molasses, red pepper and saltpetre, all of which have their advocates, and have settled down and pursued the following practice for the last twenty years. I measure a bushel of salt—spread it upon a table—weigh a pound of salt-

petre, pulverize it carefully and mix it thoroughly with the salt. This mixture is sufficient for a thousand weight of small meat or eight hundred of large, to be well rubbed upon every piece, and more especially upon the fleshy surface, taking care to pack your joints at the bottom and fill up the little interstices, with jowls, chine and rounds—the latter piece is made by cutting the neck off at the shoulder and jowl. The length of time necessary to keep pork in salt to make bacon depends upon the weather and the size of the meat. If the weather is mild and the meat small, four weeks will be long enough; but if the weather is cold and the meat large, it should remain in salt from six to eight weeks, and should be taken up at the end of four weeks and well rubbed and sprinkled with salt, in case the first has dissolved. It is then to be hung up in a dark smoke-house, and the darker the better, for the purpose of excluding flies—you will never find flies in a room where the light is completely shut out. The higher your smoke-house the better, so that you may hang your meat out of the influence of the heat—every joint and jowl should be hung by the thick end and every middling by the thick edge, or that part of the middling that was cut from the back bone; this I know to be a matter of the first consideration in making good bacon—by attending strictly to this rule, you will retain all the juices of the meat, as well as the salt that has been absorbed—or in other words, your meat will not drip; whereas, if you reverse the position and hang it by the small end, it will drip, become dry and hard and lose in weight, and what I conceive to be of more importance its fine flavor. Some who make good bacon, think that it is important to smoke your meat with some particular kind of wood, but I imagine the only secret about this matter, is the bitterness imparted to the meat, thereby rendering the taste unpleasant to the fly, and by keeping up a continual smoke, you create an atmosphere that the fly cannot live in—viewing the matter thus, we have every day or two thrown a few pods of red pepper upon the smokewood—this produces an atmosphere very unfit for the respiration of man, and I apprehend equally so for the fly. Our meat continues suspended in the smoke-house during the year, is lightly smoked every morning and plentifully smoked every damp day. If your readers will observe these rules, I will almost venture to insure such bacon as would make any epicure smack his chops. JOHN SHELBY.

BARN CELLARS.

From the Yankee Farmer.

Though the raising of roots to any amount of consequence, for stock, is of recent introduction in this country, yet enough has been done in this way to convince every observing farmer that it is a profitable business, and so evident are its advantages, that it will soon be attended to extensively. Most farmers who raise many roots find an inconvenience for want of a suitable place to store them, as but very few have barn cellars for this purpose; and when the house cellar is sufficiently large, there is great inconvenience in carrying the roots to the barn as they are fed out in winter. Besides this disadvantage, a large quantity of roots

in the cellar, especially in mild weather, will heat and produce unhealthy exhalations, to the prejudice of those who reside in the house.

The present is not a good season for constructing barn cellars, but it is the time to think about it, as many feel the want of this necessary convenience to the farm; and they should give their attention to the subject, examine how others construct them, when there is an opportunity, that they may be prepared to execute this work with discretion and despatch when they undertake it. Perhaps some of your correspondents can give us some directions on this subject that will be profitable. Some farmers object to raising roots on account of the labor of feeding in cold weather; if they will prepare to store them in the proper place, which they can do at a small expense, their objection would be obviated.

MAGNIFICENT CONSERVATORY.

From the Gardener's Magazine.

One of the most magnificent structures in England has been lately erected by the Duke of Devonshire at his beautiful residence at Chatsworth. It consists of a large tropical conservatory. In general design, it may be compared to a cathedral, with central aisle and side aisles. The entrances will be at the ends, through porches, which will be treated as green-houses. When the whole is completed, it will cover an acre and a quarter of ground. There will be a carriage way through it, which will form part of a general drive through the pleasure grounds. It will be heated by six fires, all of which, and the means of access to them, the places for fuel, &c., will be under ground, and the chimneys carried in a tunnel, up the side of a hill, to the distance of nearly a furlong, so that there will not be the slightest appearance of artificial heating, or smoke, or shed, &c., either within the house, or exterior to it. The conservatory is situated in an open part of a lofty wood, in nearly the centre of the pleasure-grounds, and is unquestionably the largest structure of the kind in existence, or on record. The whole is under the direction of Mr. Paxton, by whom it was designed. It was, probably, nearly or quite finished the past fall.

INJURY TO CORN FROM STRIPPING THE LEAVES FOR FODDER. REMARKABLE FERTILITY, AND CHEMICAL COMPOSITION OF SCIOTO BOTTOM LAND.

To the Editor of the Farmers' Register.

Nelson, Dec. 16th, 1839.

I have this year made an experiment to ascertain the loss occasioned to the corn crop by taking off the tops and blades at the usual time. Eight rows at the gathering the fodder (September) were left untouched, extending from one end to the other of a field of fifty acres. Four rows on each side of the eight extending in the same manner through the field, and on ground in every respect the same, had the blades pulled and the tops cut. The corn when matured was carefully gathered, put in separate parcels, stripped of the

shuck and measured. The corn which retained its blades and tops to the last furnished 17½ barrels of measured ears; the other eight rows which had been stripped yielded 16 barrels. A bushel of each was weighed, but there was no apparent difference by steelyard. The loss sustained by taking away the blades and tops is by this experiment within a small fraction of 12 per cent., being 11 barrels and ½. This however is not all; the land is deprived of an exceeding rich manure in the blades and tops, as will occur at once to those who have observed the places where blade and top stacks have stood; a manure that goes far towards affording an equivalent for the draft made from the land by the crop. I have a field, on the Scioto in Ohio, from which forty successive crops of corn have been taken, nothing but the grain however having ever been removed. The ground has sustained but little diminution in its product, except where the soil has been abraded by freshets on a few spots. This culture has been forced by peculiar circumstances of position in relation to the river, and the kind of labor used there, but is about now to be changed, as those difficulties are overcome. I am sure no land could have borne such a system where the tops and blades were taken off; but the limits of a letter would not afford space for my reasons.

I left at your office in Petersburg, last June, a specimen of soil from the field here mentioned, and a specimen from some ground yet covered with wood immediately adjoining, also a third specimen from land that had yielded crops for the last ten or twelve years, from the vicinity, and of the same formation. An examination of these specimens, by one (like yourself) skilled in the analysis of soils, might lead to interesting results.

Yours, with high respect and regard,

T. MASSIE.

The specimens of soils from the Scioto bottom land referred to above were marked by Dr. Massie as follows:

"No. 1. Virgin soil, still covered with forest.

No. 2. Soil a few years cleared and cultivated.

No. 3. Soil from a prairie that has borne forty consecutive crops of corn. The land lies near the confluence of the Scioto with Paint Creek, and has many evidences of having been formerly the bottom of a lake."

Upon being carefully examined for *carbonate of lime*, No. 1. contained none; and No. 2. barely a trace, if indeed any at all. Our correspondent will merely in this see confirmation of our doctrine of "*neutral soils*," and not infer that these soils are destitute of lime in some other form, though containing none in that of *carbonate*.

No. 3. (the prairie soil, of such enduring fertility,) from 500 grains, tried in Davy's pneumatic apparatus, yielded 24 oz. measures of carbonic acid gas, indicating the presence of 48 grains of carbonate of lime, or very nearly 10 per cent. But there was evidence that a large proportion of this carbonated earth was *not lime*, but *magnesia*; though we had not the means to determine the proportions of each of these earths. This is a

remarkable fact, and an additional confirmation of our opinion formerly expressed, that the carbonate of magnesia, as an ingredient of soil, is a powerful cause of fertility, instead of barrenness, as supposed by some European writers. We formerly found (by accurate examination and sure tests) magnesia as well as lime in the fertile alluvial soil of Red river; and we have lately seen it stated that magnesia is also an ingredient of the alluvial borders of the Nile.

Our highly respected correspondent overrates our skill and knowledge in analyzing soils, and still more our facilities. It was on account of being unprepared for such work, that the delay and apparent neglect in this case have occurred.

ED. FAR. REG.

For the Farmers' Register.

REMARKS ON MR. CARTER'S PROPOSED
CHANGE OF ROTATION. INSECTS AND
WEEDS.

January 17th, 1840.

Looking over the Dec. number of the Register, my attention was attracted to the signature of "Hill Carter," and as every thing from the pen of that eminent agriculturist is of peculiar value, I perused his piece with unusual interest. Mr. Carter's thoughts have been drawn, (and I am rejoiced to see it) to a subject as mysterious and unexplored as it is of the highest importance. In all time the depredations of insects have been the most serious drawbacks on the profits of agriculture, and their increase within the last three years in Eastern Virginia has justly produced the most alarming apprehensions. I am superstitious enough to view it in the light of a Divine dispensation, and as such cannot, without supernatural aid, be controlled by the power of man; we should however do all that we can, and leave the issue to Him whose chastening hand will be withheld only when the attribute of justice gives way to that of mercy. Both as a Christian and as a farmer, I am truly gratified to see such subjects introduced for examination; and a free discussion of them may lead to meditation on the causes of Divine visitations, and thus may benefit our moral, if it does not our agricultural, condition. Mr. Carter's idea (as I understand it) is, that encouragement is given to the depredations and increase of insects, by yielding to the land a portion of its own productions, and that, "*e converso*," they can be checked by depriving the soil of its vegetable cover; and close and severe grazing is pointed to as the remedy for the evil. To accomplish this end he proposes the adoption of a five-field rotation, viz., one year of rest, one year of close grazing, and three years of grain crops in succession. We will now see if the end will be answered by the means proposed, and secondly, what will be the effects on the land from this system of culture. Of all the insects whose ravages are most fatal to the hopes of the farmer, the chinch bug and Hessian fly stand pre-eminent; indeed all others are comparatively innoxious. To those who have at-

tended to the habitudes of these insects, it is well known, that neither of them ever assail the great ameliorator in our system of husbandry, the clover crop; in it they neither find food or shelter. To deprive the land therefore of this, its only recuperative crop, when it is required to bear three exhausting crops in succession, would be to induce sterility, without giving a check to the evil complained of; for it is a well known fact, that all insects find a greater supply of food, and consequently remain longer and multiply faster on weak and delicate plants, the product of exhausted fields, than on those of a more vigorous and rapid growth. If close grazing was the remedy to control their ravages or check their increase, as Mr. Carter imagines, then would actual experiment have long since tested the fact. Eastern Virginia is divided into two systems of agriculture, antipodes to each other; one, the inclosing or non-grazing, the other, the old three-field or close grazing system. Now I appeal to all observation to say, whether the latter has ever been, or is at this time, more exempt from insect enemies than the former; and I leave the answer to those who have noticed the results of the clover worm, so called. I have never, before the instance adduced by Mr. Carter, heard of their doing injury to the wheat crop, especially at the fall season of the year. I had thought their depredations were confined to spring crops, and in warm weather. In the spring of 1818 (I think it was) their inroads were more general and more fatal than at any subsequent period; and I well remember that complaints were then louder from those farmers whose crops were grown on thin highlands, than from those on low grounds; and the cause was easily enough explained, the crops growing on lands impoverished by severe grazing and hard cropping were more dilatory, and, paralyzed by a backward season, were longer exposed to the attacks of the insect than those produced on a more genial soil, highly stimulated by vegetable matter turned in for their preparation. The last soon got beyond the reach of the insect, while the first were slowly growing and staggering under the attacks of their foes. With these facts before me, I cannot acquiesce in the soundness of a theory, from which certain and inevitable evils must flow, while the anticipated good is, to say the least of it, uncertain and doubtful.

I will now examine into the effects on the soil of a five-field rotation in connexion with close grazing, and I think it abundantly susceptible of proof, that its results will be found highly disastrous. The first objection to the proposed system is, in my opinion, insuperable, and needs no other charge against it to ensure its entire rejection, viz., it demands three exhausting grain crops in succession; and when is superadded thereto, a close and severe grazing the year preceding the introduction of this scourge, there can, I imagine, be no difference of opinion as to its total condemnation. Under this system of heavy exaction with inadequate returns nothing can save the doomed fields from utter prostration. No depth of soil, no vegetable or mineral manures, and no agricultural skill, can ward off their inevitable destiny; the redeeming year of rest could no more save it than could a moment's respite from torture shield from death the unhappy sufferer stretched on the fatal rack. The lapse of five years between the drilled and horse-hoed crops is another material objection to the contem-

plated rotation, inasmuch as every encouragement would be thereby given to the production and perpetuation of vegetable pests—an evil, I will venture to say, as deleterious to the land, and as fatal to the hopes of the cultivator, as its kindred curse of the animal kingdom. Bad as they are, I would rather have to contend with chinch bug, Hessian fly, and clover worm, than with wild onion, blue grass, Canada thistle, "*et id omne genus*," of annual and perennial pests. I might hope in the efficacy of a severe winter, or some other natural cause, to relieve me from the one, and I know, by sad experience, that years of toil will not free my poisoned fields from the other. To use a common expression, I know a thing or two on this subject, having once tried, and am now reaping the bitter fruits of a six-field rotation. From the 1st of March to the 10th of April a great portion of my farm labor is employed in what is technically called "cockling wheat," i. e. abstracting wagon loads of wild onions from the crop; and after all, if I escape, at the time of delivery, a receipt from the miller for—bushels of onions mixed with wheat, I consider myself extremely fortunate. This fact will be endorsed, I am sure, by a near neighbor, who has a similar calamity entailed on him by upwards of 20 years' perseverance in a five-field rotation, which, fortunately for his splendid estate, has been at length abandoned. If the clover crop in the proposed rotation could at all times be relied on, then the year of rest would be indeed a year of jubilee to the persecuted fields, but that crop has become as precarious and uncertain as any other, and, whenever it fails, the noxious and more hardy plants that spring up in its place have a fair field for propagation; and as they are rejected by all animals as food, they will have two years in five of undisturbed possession, to strengthen and perpetuate themselves. Without going farther into this subject, or adducing additional reasons to substantiate my dissent to the proposed plan, I cannot but express my fear that when the theory is reduced to practice, it will be found unavailing to arrest the depredations or check the increase of insects, while it will entail evils not less disastrous and far more difficult to conquer. The great master of the human heart has taught us that "it is better to bear the ills we have, than fly to others that we know not of." The advice is not the less wise and true for its being poetical. I know not how it may be in the section of country below tide-water; but with us, above it, a cleansing crop once in three or four years is indispensable in any system of neat and profitable farming; and so well satisfied are our best farmers of this fact, that the three-field rotation is getting into general use. I do not mean the old Virginia land-killing course, of corn, wheat, pasture, but the more modern routine of clover, corn, wheat, aided by a liberal use of putrescent manures, permanent meadows and standing pastures of artificial grasses.

This subject is most attractive, and strongly tempts in its support an excursion into the field of discussion; but having occupied my full share of your columns, I will leave it to a better farmer to detail its advantages. Mr. Randolph Harrison of Elk Hill, Goochland, has fully tested the rotation, and his fine estate bears ample testimony of its efficacy: I therefore hope he will be induced, through the Register, to delineate its advantages, by detailing his practice and its effects on his land.

R.

NOTES ON EUROPEAN AGRICULTURE. BY A CHARLESTONIAN.

No. 1.

From the Southern Cabinet.

The American traveller who visits Europe for the first time is introduced so suddenly upon such a variety of objects, equally new and interesting to him, that he finds it difficult to confine himself to any department of science or knowledge. Scarcely has he shaken off the tedium of a long sea voyage, and recovered the use of his legs, and the steadiness of his head, when his mind is distracted by a multiplicity of objects, all inviting his attention, and each claiming the precedence. He now visits for the first time scenes of which he read in his youth, and which, from their antiquity and early recollections, have become classic grounds. He traverses the fields of tournaments and battles—he climbs Ben-Lomond and the Alps—he ascends the Rhine and the Danube—he sails over the smooth waters of the lakes of Scotland and Switzerland—he visits the thronged cities of London and Paris, Berlin and Vienna, and finds a world of wonders in each—and who, Mr. Editor, has time or inclination to attend to the dull scenes of agriculture?

I confess that this was in part my own case. A very extensive tour, during the short summer of 1839, enabled me only to take a cursory view of the agriculture of Europe—other objects engaged the principal part of my attention. My notes were made hastily, and never corrected. Such however, as they are, I will give you. But I must be allowed to do it in my own rambling way, and in my own time. I need not say that the southern planter will find nothing in my notes that will throw any light on the cultivation of the staple articles of our southern country. Cotton and rice, although abundant in the warehouses and manufactories, and although feeding and clothing half Europe, are not cultivated there, and Indian corn (in consequence of the cool summers) I only saw growing at one place in Baden, and the stalks were not much larger than a pipe stem. Yet in the cultivation of other articles—in the rotation of crops—in the system of manuring, and other modes of restoring and improving exhausted lands, we have much to learn from the older countries of Europe, where a dense population has taught them the value of lands, and the necessity of calling in the aids of science and the arts in their cultivation.

As a general remark, I am disposed to believe that Europe in general, and England in particular, is more favorable to the cultivation of wheat, and other grains, which go under the denomination of corn, than the United States, with the exception perhaps of our western country; but that our own soil can by a proper system of tillage be rendered twice as productive as it is at present. The improvements in implements of husbandry can be more easily introduced among us than in Europe, where it is exceedingly difficult to induce the laborers to lay aside the old heavy ploughs and wooden-toothed harrows, which we have abandoned for half a century; and when I have seen the miserable hoes, spades and rakes, used by the peasants of France and Austria, I have sometimes wished that a revolution (not political, but agricultural) might sweep them and their wooden shoes

into oblivion together, to be remembered only as the relics of a clumsy, if not a barbarous age.

In fine breeds of horses, horned cattle and sheep suited to the different climates and pastures—and in the careful manner in which these distinct varieties are kept separate, Great Britain takes the lead of the world. The black faced sheep of Scotland differs so widely from the varieties found in the downs and low countries of England, that they would scarcely be recognized as the same species. The same may be said of the black cattle driven from the highlands to the markets of Edinburgh and the northern counties of England, when compared with the various breeds found in the level rich counties of England. Each variety is confined to localities suited to its size and habits. The mountain cattle and sheep would not succeed well in the low countries, nor would the breeds of the downs thrive on the mountains. No traveller in England who knows a horse from a donkey, can fail to admire the distinct breeds of horses each in their nature admirably adapted to the services required of them. The carriage-horse, the hunter, the dray-horse, and the racer, can be distinguished at a single glance. The dray-horse in the streets of Liverpool and London, unwieldy as the elephant, with a foot of the size of a peck tub, could scarcely be conceived to be the same species as the little Shetland pony, that is seen carrying the groups of gay travellers to the top of Ben-Lomond, climbing over the rocks and up the mountains like so many squirrels. I witnessed at Ratisbon, in Bavaria, one of the finest collections of horses I ever beheld. They were owned by the prince of Taxus, whose expensive stables were more magnificent than many of the palaces of Europe,—fitted up with marble troughs—fountains for bathing—the name, country, and pedigree of each placed in gilt letters on the wall. The number of grooms, and careful attendance, and other facilities, reminded me of what I had read of the honors paid to the sacred bulls of India, or the white elephants of Ava. Among these were horses not only from Mecklenburg, Saxony and France, but from England and Arabia; and to me the English courser appeared not only the most elegant in form, but was admitted by better judges than myself, more active and fleet than those of Arabia itself.

In the preservation of seeds of grain and vegetables, infinitely more pains are taken to preserve the varieties distinct and unadulterated than with us. In the mountains of Scotland, there are certain districts appropriated solely to the cultivation of garden seeds—and no two varieties, that are in danger of becoming adulterated by being placed near each other, are allowed to be cultivated in the same district. I noticed, at Edinburgh, in the collection of Lawson & Son, seedsmen and nurserymen to the Highland and Agricultural Society of Scotland—83 varieties of wheat, 62 of peas, 51 of turnips, 146 of potatoes, and an immense number of species and varieties of grass seeds, some of which may probably be adapted to our southern country. In a subsequent number, I will endeavor to recur to this latter subject, and point out those species on which it would be advisable to make experiments.

The benefits of societies for the promotion of agriculture, in stimulating industry and ambition, I saw exemplified in Scotland, England, and at

the fairs of Germany. The Highland Society of Scotland has existed sixty-one years, and from one of the bleakest and most sterile countries of Europe, Scotland has, with all its disadvantages, risen to a state of agricultural prosperity, far beyond any thing which could have been expected from a soil and climate; and some of the counties, especially the Lothians are not inferior, in point of cultivation and product, to the richest in England. At a meeting of that society, held a few weeks previous to my arrival, 177 members were added at one time, paying three guineas entrance, and one guinea annually, and these included the names of the most respectable men in the country. At this meeting, there was an additional sum of £1,500 (\$7,000) subscribed, to promote the interests of the society. Every agricultural county makes an annual report, and thus thirty-three reports, embracing every object of agricultural interest, are annually submitted to the society.*

English agricultural societies, although with less uniformity, are sedulously engaged in the same cause, and the result has been the general diffusion of agricultural knowledge. The different soils have been analyzed—the kinds of manures and modes of cultivation adapted to each have been pointed out. The steam engine has been introduced in thrashing and for other agricultural purposes, and Great Britain, (including Ireland and Scotland) which formerly averaged only nine bushels of wheat to the acre, last year produced in the aggregate, 19½

* This society was founded in 1784, by a few gentlemen, who "formed themselves into a whole and corner club, in a coffee house called the Exchange," in Edinburgh. From a most wretched state they have raised the agriculture of Scotland, until it has reached the very topmost rank. The means which were employed by this society, are thus detailed in the Edinburgh Quarterly Journal of Agriculture:

"In the days of its youth and feebleness, the Highland Society sent the leaven of the turnip husbandry into all the glens and straths of the north, by offers of small prizes to certain Highland parishes; and the same may be said as to the growth of clover and the finer grasses. As it advanced in strength (as to numbers and to cash,) attention was paid to premiums for stock; then came offers of reward to men of science to discover better implements and machines, to diminish friction and consequently draught, such as in the thrashing mill and other parts of agricultural machinery. Still advancing in the scale of intellect and of science premiums were offered for essays to bring to light the facts connected with chemistry and natural philosophy; and, under the auspices of the society was set up the 'Quarterly Journal of Agriculture,' a work which has been the vehicle of conveying so much useful information to the agriculturist, that we humbly venture to say it ought to appear on the table and book-shelf of every farmer's parlor. After this, the great stock shows were resolved upon, as another link of union between the society and the practical farmer, at the same time throwing aside all paltry feeling, and making them open to stock from both sides of the Tweed, [i. e. from England as well as Scotland.] How well they have succeeded, let the last one at Glasgow bear witness. (This was the most splendid show of fine cattle ever exhibited.) Nor has the society forgotten the beauty of the country, as the premiums offered in regard to planting trees and such like subjects fully testify; and to sum up all, it may be said, the Highland society has been a *point d'appui*, a rallying point, to which the agriculturists of Scotland might look, and a fostering mother to all who, although strong in talent, were weak in interest to make it public,

bushels; and three of the counties of Scotland, and several of England, averaged 51 bushels to the acre. A farmer by the name of Thomas Oliver, residing five or six miles from Edinburgh, leased a farm for the last twenty years, of 150 acres, paying annually a rent of 10 guineas per acre, (\$7,500) on which he raised grain, hay and vegetables for the market of Edinburgh. This lease he has recently renewed for nineteen years, (the usual time to which leases run) on the same terms, and from a poor man he has become independent in his circumstances, and now rides in his carriage. What American farmer could make a profit that would enable him to pay such an enormous rent? All may be accounted for on the principles of judicious manuring and careful industrious cultivation. On the continent, especially in Germany, their annual fairs bring together the farmers and peasants of all the surrounding country, where their ambition and industry are stimulated by a variety of fetes, and the distribution of prizes to successful competitors; and whilst princes, dukes and barons are engaged in awarding prizes to those who have been most successful in the cultivation of grains and cattle, their lovely wives are occupied in a humbler, but much more lively scene, in complimenting and distributing premiums to the industrious housewife, for her fine specimens of fruit—her butter and cheese—her linen cloths, weaving, knitting, and other manufactures. I have no doubt I shall be ridiculed for my want of taste, when I state that, to me, the Grand Duchess of Baden, presenting a silver cup to a peasant girl, before an assembled crowd of farmers and nobility, for the finest specimen of manufactured gloves, was a more interesting sight than that of the gay Queen Victoria, racing through St. James' Park, with fifty fools at her heels, striving not to be distanced by their lovely mistress.

The industry and expense bestowed in collecting and applying manures in England, and which is only exceeded by the more scientific mode adopted in the environs of Paris, at the "Boyanterie de Montfaucon," where all the offal from the city, including every dead animal—(the horses of this description alone amounting annually to 16,000)—is converted into manure, may be noticed in a future number, and is a subject which is not only of great importance to the farmer, but should be carefully investigated by the authorities of all large cities.

From a cursory review of the cultivation of the various kingdoms of Europe, it appeared to me that England was in the highest state of cultivation, and which, from its beautiful thorn hedges—its neat cottages, adorned by the eglantine, honeysuckle and ivy, chequered here and there by the park and lordly palace, rendered the whole land a picturesque garden. Some of the counties of Scotland, such as the Lothians and the earse of Sterling and Gowrie, are in no wise inferior. The little I saw of the cultivation of Ireland, rather exceeded my expectations. Belgium and portions of the Netherlands, have a better soil than that of England, and are fully as productive, but they want neatness of cultivation, and, like the whole continent of Europe, are destitute of fences and hedges—to me the fields wanted ornament, and the cottages seemed without much comfort. The fields of Denmark were loaded with an abundant crop of wheat, but there, as well as every where

else, I heard bitter complaints of hard times, and the severe exactions of government. I frequently thought that it would be no bad plan for our American grumblers about taxes and oppression, to take a trip to Europe, and learn a wholesome lesson. Take my word for it—it will stop the mouths of demagogues, reconcile them to their own country, and they would return—not as politicians, but Americans, saying, I have sinned against heaven and my native land, and am now only worthy to be called thy son. I found the Grand Duchy of Baden and parts of Wirtemberg, better cultivated than Prussia in general, probably because the soil was more susceptible of improvement. Switzerland is too romantic to be rich—and the Rhine is too classic a stream to be the dull river of commerce, or be surrounded by any thing else than mountains, where the vine clammers along its sides and the ruined castle frowns on its loftiest peaks. In the cultivation of France, I was greatly disappointed—the sword has scarcely had time to be beat into the ploughshare—the soldier finds it hard to stoop to the labor of the harrow and the hoe, and seems disposed, yet a while, to leave this drudgery to the women. Austria, with its fine soil and climate, is retarded in agricultural improvement by the wealth of its nobles and the oppression of its peasantry. Its possessions in Bohemia appeared rather better cultivated than those portions bordering on Hungary and Venice.

Of fruits, I found the apples in England leather-y and inferior—on the continent, the flavor was finer—but I give a decided preference to those of my own country. Peaches were every where wanting in flavor. The best I tasted were from a green house near London. The only ones I found growing in the open air that I regarded as in any way comparable to those of America, were at Schaffhausen, at the falls of the Rhine. But whilst the Northern part of Europe does not appear to be well adapted to impart a delicious flavor to the apple and the peach—it greatly excels in other fruits. I find myself growing envious when I think of their fine gooseberries and cherries—the pears and plums of France and Germany are most delicious, and when my notes inform me that I bought the latter, of the size of a fowl's egg, twenty-five for a penny, I feel that I ne'er shall see the like and so cheap again. Were I a cultivator of fruits in Carolina, I would import the few varieties of apple that succeed in our middle and back country, and the peach that succeeds every where, if not attacked by the curculio, from Pennsylvania or New Jersey—the gooseberry and currant, which succeeds among our mountains, from Long Island—the cherry from some of our northern states—the grape from some of the best varieties cultivated in our upper country—and the pear, plum and prune from Bordeaux; those brought from the latter place, are particularly adapted to the climate of Charleston, and I have seen them cultivated here with great success.

PEACH TREES.

From the Agriculturist.

Lest some one may suffer from ignorance as I have done, I give my woful experience to the public; for it sometimes does as much good to

guard the farmer against error, as to inform him of an improvement in his husbandry.

For three successive years I gathered about $\frac{1}{2}$ a bushel each year of choice peach stones. I laid them by in a safe place as I collected them, and about the first of October planted them in rows where I wished to form a nursery. In the two first trials, not a single one sprouted and came up. About one out of fifty germinated in the third trial. I was much at a loss to account for three fatal failures. I was informed by two or three farmers, that if I would crack the stones in the spring and plant the kernels, they would come up. I tried that plan and made another entire failure. And just about that time I read in the *Cultivator* the remarks of an eastern farmer on the subject; in which he impressed the idea that *nature's plan should be followed*, and that nature's mode of propagating peach trees is to drop them from the tree when ripe, and to cover them with washing rains, the rooting of hogs, or the leaves of the tree. So that he inferred that peach stones *should be buried as soon as taken from the tree before they get dry*. He then gave his own experience to prove the correctness of his reasoning.

Immediately upon reading his remarks, I remembered having selected stones and planted a nursery for my father while I was a boy, and that I had accidentally managed it as this eastern farmer directs, and the stones all came up and afterwards made a fine orchard. I have since planted some stones in the summer as soon as gathered, and have succeeded in getting a stand.

FRANCIS H. GORDON.

Clinton College, Dec. 28, 1839.

EXTRACT FROM AN ACCOUNT OF AN AGRICULTURAL EXCURSION INTO ST. JOHN'S, BERKLEY, [S. C.] BY THE EDITOR.

From the Southern Cabinet.

The parish of St. John's, Berkley, is long and narrow, extending from the Eastern branch of Cooper River to a short distance above the Eutaw Springs, a distance of near 50 miles. Its eastern boundary is the Santee, and its western, the parish of St. James, Goosecreek, embracing the western branch of Cooper River. The lower section of this parish includes some of the finest rice plantations in the state. But of these it is not our intention, at present, to give any account, and we shall, therefore, confine our remarks to middle and upper St. John's. The soil of this parish embraces almost every variety, with perhaps the exception of the stiff clay. In the lower section, the clay preponderates, so far as to form what may be termed a clayey loam. In the middle, much of the land cultivated is a light sandy loam, while in the upper part, the sand predominates, forming a very light soil. In this classification, we of course confine ourselves to the highlands under cultivation. Throughout the whole parish, pine barrens abound, and along the Santee, and in other places, portions of the swamps are reclaimed.

The crops cultivated are cotton, corn, peas, potatoes, groundnuts, (in small quantities,) and rice in sufficient quantities to supply the demand for family use. Cotton of course, is the principal crop intended for market, while the others are generally planted only to meet the demand of the plantation,

though we were happy to find that on some plantations, corn was also one of the crops raised for sale, and that it was profitable.

We were sorry to find, that no rotation was adopted, but that usually, the fields supposed best adapted to the culture of particular crops, were selected for these crops, and under such were kept with little variation. Yet to such an extent do they now carry the manuring system, that these fields, with the exception of those cultivated in potatoes, have actually so improved as, in some instances, to yield from 50 to 100 per cent. more than formerly. This has been brought about, as we have already stated, by manuring, and in nothing were we more pleased than to find how universally this practice has been adopted, and how strenuously all are engaged in this laudable work. When we first visited St. John's, so little was the system of manuring appreciated, that the few who had commenced the practice systematically, were actually laughed at by their neighbors as visionaries—not that manuring was wholly unattended to, but because they thought it impossible to manure the whole of their crops. Little attention, therefore, was paid to the subject. What little manure was made, was placed in meager quantities around the corn, or some crop near the homestead, and the clearing of new land was relied on to supply the places of those fields which were worn out by constant culture. In this respect, we were happy to find there had been a great change of opinion, and consequently of practice. On every plantation we visited, (and we have understood, on all or nearly all,) the collecting, preparing and applying of manures, is considered of primary importance, and is now conducted systematically. The manure most used, is what is here called "*compost*." It consists of quantities of leaves, gathered in the woods and carted into the stables, cattle, sheep and hogs' pens, and from thence into the fields. A specific number of hands and carts are set apart for this work, and on no account (on most plantations) are they diverted to any other. Dr. Ravenel has one cart and mule, with the driver, and two young negroes, (a girl and boy, who could not be employed advantageously in the fields,) constantly engaged in hauling in "*trash*," consisting principally of pine and oak leaves, raked up in the woods adjoining. The distance is not great, and with this one, thus employed throughout the whole year, and the use of two ox carts, for five or six weeks in summer, he manages to keep every thing well littered, and to make about 15,000 ox cart loads of manure, each load averaging about 50 bushel baskets. On this he pens about 60 head of cattle during the winter, (all of which he regularly feeds,) and about 150 to 160 during summer, about a dozen or more horses, a tolerable large flock of sheep, and a number of hogs.

Major Porcher and Mr. Joseph Palmer keep four carts constantly at work, but the distance they have to cart is greater. We did not ascertain the number of animals penned by either of these gentlemen. At Major Porcher's, we saw a quadrangular pile of manure, taken from the stables alone, the base of which would measure from 80 to 100 feet, and which was from 5 to 6 feet high. That from the cowpen we did not see. We regret we had it not in our power to visit the plantations of Messrs. Joseph Palmer, Jas. Gailloard and Thos.

W. Porcher, all residing in the upper part of St. John's, and all actively engaged in manuring their lands and improving their crops. We had, however, the pleasure of meeting these gentlemen after our return, in this city, and from them we gathered a few particulars, relative to these.

From the vast amount of new vegetable matter (and that not of a kind easily decomposed,) carried into the pens, the relative quantity of animal manure cannot be large, as may easily be supposed. On some plantations, all of the cotton seed, which can be spared, is spread in one of the pens, and this manure is then used for the crop to which the cotton seed is usually applied. This plan, however, is very little adopted, the cotton seed being more generally applied alone. Others scatter over the pen, a short time before carting out, a quantity of salt; whilst others again, previous to hauling it away, throw their manure into heaps, scattering between each layer a quantity of salt, sufficient to be diffused throughout the whole mass. This manure is highly prized, and its effects have been very gratifying. We shall have occasion to refer to this manure when we come to speak of the crops.

Lime, marl and ashes, are also getting into use, and some small experiments have been highly satisfactory. In some few instances, the leaves taken out of the woods have been at once carted into the fields, and used with benefit to the succeeding crop. These fields are of a clayey nature, and of course the best adapted for such crude manure. It was truly gratifying to us to find how much attention is paid now in this parish to manuring. Many things, which not a few years ago were permitted to lie neglected, and were rather considered nuisances, but not of such a character or in such quantities as to require abatement, by being carried off, are now sedulously sought after, collected, and carted off to the fields at the proper periods, where they fulfil their destiny, by adding materially to their fertility. In such just estimation is manuring now held, and so striking have been the effects, that planters are no longer anxious to clear new fields, unless forced to do so by the want of room. The attention of most of them is turned to the renovating of their old fields, and what a few years ago would have been deemed a hopeless task, is now actually in progress, and fields which were deemed at most unfit for culture of any kind, are now restored to their pristine fertility. In fact, experiments have been stated to us, going to show, that old fields constantly manured, (and in what would be considered but moderate quantities elsewhere) have become more productive, than fields recently cleared. We select an instance furnished us by Mr. Thomas W. Porcher, of Walworth. Among the fields cultivated by him the last year, were three. The first, which we shall designate as No. 1, was considered as nearly worn out when he first took possession of this plantation, ten years ago. Nos. 2 & 3 were newly cleared, and the last year was the second and third of their culture. No. 1 had been regularly planted every year for the last ten, but had also been constantly manured. Nos. 2 & 3 were not manured, for the second and third years, are deemed the most productive. With the exception of one or two years, when potatoes were cultivated, cotton had been grown on No. 1 every year; Nos. 2 &

3 had also been cultivated in cotton, since they had been cleared. The product of the old field (No. 1) was an average of 170 lbs., that of the new fields (Nos. 2 & 3) 135 and 150 lbs. We find also from referring to our notes, that at Mexico, a field which had been cultivated without rest since 1801, and nearly the whole of that time in cotton, produced 176 lbs. per acre, while the new fields only two years under culture, yielded 77 and 109 lbs. per acre.

THE JERUSALEM ARTICHOKE.

From the Agriculturist.

Clinton College, 20th Nov., 1839.

Messrs. Editors:—For the satisfaction of all who may feel an interest in the culture of the Jerusalem artichoke, I am disposed to give them, through your paper, so much of its history and mode of culture as I have learned. Having about 20 acres of this valuable product myself, I am often interrogated as to its nature, value and culture.

Its botanic name is *Helianthus Tuberosus*, and is supposed to have been originally discovered first on the borders of the Gulf of Mexico; whence it has been carried and cultivated in Europe for the table and for food for hogs. But it does not appear to be so productive in England, where it has been cultivated to advantage, as it is here. There five hundred bushels to the acre is considered a large crop, but here I am satisfied that one acre of common soil, the second year after planting it, will yield at least 1000 bushels, and many acres will overgo that amount. So that its native country is best adapted to its production.

The race which I have was discovered about 7 years ago, in Jackson county of this state, by Mr. Samuel Young, and from its correspondence with the description of the Jerusalem artichoke, I unhesitatingly pronounced it the same. Before discovering the Jerusalem artichoke, Mr. Young had cultivated for his hogs the common white variety (*Cinara Colymus*) and finding no profit in them, had abandoned their culture. During last spring, about $\frac{1}{2}$ of an acre of the Jerusalem artichoke was discovered on the farm of Harris Tuggle, of Wilson county. Mr. T. had seen them in his field for several years, and regarding them as noxious weeds, had tried to exterminate them without success. But when he found by comparing them with mine, that they were artichokes, he set a different estimate on them. From the farm of Mr. Young, various persons have obtained and cultivated them as food for hogs, all of whom unite in their praise. And the accounts given of their productiveness and value in feeding hogs are almost incredible. Yet the statements are made by men of unquestioned veracity, and the accounts of all who have tried them correspond, so that we can hardly disbelieve. In the spring of 1838, a neighbor of mine, who is incredulous to any report which has the appearance of extravagance, having heard of the products of the artichoke, remarked that he thought it looked like "too many squirrels up one tree." But when he came last spring to dig some for seed out of my patch, he recalled what he had formerly said, and gave it as his opinion that it was equal to its representation. The great advantage of the artichoke is, that it contradicts the assertion, that "there is no royal

road to wealth," for it will yield considerable profits almost without labor. You have to plough the ground well in January, February March, (the earlier, the better) and immediately check off 4½ feet each way, and propping one artichoke in each check, cover them with the plough. About the time they come up plough them like Irish potatoes, and then again cross plough them about one foot high and you are done cultivating them for ever. The first year they will make from 400 to 700 bushels per acre, and afterwards they will improve for two or three years, till they will yield about double the product of the first year. I now speak from experience. The hogs being allowed to root them all the winter, is an advantage to them, because they root up and soften the soil to a great depth and the artichokes will fill the soil as far down as it is pulverised. Thus they improve for several years, enough always being left by the hogs to set the ground completely. And lest some one should object, that they might freeze if planted in the winter I remark that this artichoke will freeze and thaw all the winter and still be as good in the spring as if it had been in a cellar. The only way in which it may be injured is by exposure to the air long enough to let it get dry, when it withers up to a hard stick. Hence, in transporting them, we have to keep them moist, in order to preserve them.

Your hogs should not go on them until about the first of November; when the trouble of feeding is over till spring, for each hog "roots for his living."

Sows with suckling pigs should not go on them, for the artichokes injure the qualities of the milk, so as to make the pigs dwindle. But as soon as pigs are weaned, they will do finely by rooting for their living.

Heretofore, I have given artichokes to all who desire them, and still give to my neighbors who will dig them; but being often called on by persons at a distance, I propose to accommodate them, in a manner that will take care of number one. Wherever persons will unite and take a wagon load I will send a load. I can deliver them at Gallatin, Nashville, Franklin, Columbia, Murfreesborough, or McMinnville for \$2 per bushel, 5 bushels being enough to plant an acre.

I am decidedly of the opinion that this artichoke will form a valuable accession to the husbandry of the western country; because every farmer may keep his hogs through the winter without labor, by devoting rugged parts of his farm, or some thin woodlands to artichokes.

FRANCIS H. GORDON.

SUGGESTIONS TO PERSONS ABOUT TO COMMENCE SILK-CULTURE. REQUISITES FOR EXPERIMENTS. THE NECESSITY FOR EGGS FROM HEALTHY STOCK, AND THE MEANS OF OBTAINING THEM.

Deeming that the establishment of silk-culture as a regular branch of agricultural employment will be of great importance to the interests and prosperity of the United States in general, and especially of Virginia—and that this is the most favorable juncture that ever has or may ever again

occur for the commencement of many and extensive experimental operations in this new business—we hope to be excused for repeatedly attempting to enforce the importance of the subject, and to induce as many as possible now to prepare for a first experiment, and with such means, and such care, as will make their success almost certain. If our advice can have any such effect, it can not be later than this time; for perhaps before another monthly publication shall issue, it will be too late for persons then desiring it to commence preparations, and especially to secure the possession of good eggs, without which requisite for success, the results of the experiment, (whether as to information or product,) will surely be failure and loss, disappointment and disgust.

One very important and widely extended means for beginning silk-culture this year, never has before existed, and perhaps never will again. This is the great superabundance of *morus multicaulis* trees of which not only the leaves, but the trees themselves, can now be obtained for almost nothing. This state of worthless superfluity, caused by the madness, and after prostration of the speculation in trees, cannot continue; for, if worthless for sale, the plants will not be preserved by any but those who will use them for feeding, and who will therefore know their value. They will not be permitted to occupy valuable land, and others will generally perish by neglect, or be destroyed by grazing cattle, and, whether silk-culture be established or not, there will not long remain any superabundance of these trees.

Owing to this and other existing circumstances, almost every person in the country who has a spare room, or can put up a log-house (which would not cost \$20 to build,) can this year make an experiment cheaply. And if the first trial is as successful as can be reasonably expected, considering the necessary imperfections of every first trial, then the experimenter will be prepared, both in experience and other means, for a larger and properly conducted business, the following year.

We are gratified to hear every week of more and more extension of operations in feeding designed in lower Virginia this year; and we are already satisfied that, even in this year, silk-culture will be a business of some importance, as to the number and extent of operations. Still this approaching to the end desired, makes us but the more anxious (because inspired with more confidence) in urging on others to follow the example, in small and carefully conducted experiments, and thus to plant the seeds which will furnish a harvest of a hundred-fold increase of operations the succeeding season.

It is essential to success and to the satisfaction

of the experimenter himself, that he should carefully and properly conduct his operations. This all can do, though it may not be convenient to all to be so methodical and systematic, as to fully instruct and convince others as well as themselves. But there are many individuals who can properly and regularly observe and note down, as well as conduct their operations, and they can perform the important service to the public interests of proving, and placing beyond all controversy or question, either that silk-culture is certainly profitable as an extended and regular business, or that it is *not* so. The latter proposition, if true, will be only secondary in importance and value to the former. The truth, whichever way it may be found, should be the only object sought; and such experiments as we recommend would be the sure and speedy means of reaching that end, in one or the other way.

Though there have been already made, and reported, some very interesting and valuable practical and even extensive operations in silk-culture, (and which have been published in this journal,) still there is not one of them that was not defective in some important particulars, which more careful observation might easily have supplied. We request of all our readers who design to feed silk-worms methodically this year, to select some one or more broods, and to observe minutely and write down every circumstance that may effect the result, and afterwards to report to us the results. Any number of such reports can be thrown into a tabular form, so as to present at one view a comparative statement of the progress and results of all the different operations. To induce more regularity and uniformity in such experiments and reports, we will here suggest the matters which are either essential, or, if not essential, at least desirable to be known, in experiments that can be considered as at all conclusive.

The facts which should be observed and regularly noted, in a full and complete experiment of silk-culture, we deem to be the following:

1. What variety of silk-worms—the weight of eggs put to hatch—and the weight of worms to be fed immediately after being hatched, (to be ascertained by weighing the refuse eggs, and paper or cloth,)—or by any mode to show, as nearly as may be, the number of worms at the commencement.
2. Dimensions of feeding apartment—plan of management and space (in square feet) of shelves used.
3. Description and quality of land occupied by the trees fed from, and its rent or value.
4. Number, age, and description of trees.

5. Number and kind of laborers employed, and the cost for preparation and cultivation of land, gathering leaves, and feeding, stated separately so far as may be, or otherwise altogether.

6. Weight of leaves used—and of the unconsumed leaves, litter and excrement taken out, during the whole feeding.

7. Temperature of feeding apartment observed at, and before sunrise, 2 o'clock P. M., and 9 P. M.—changes and state of weather—and when artificial heat used, if at all.

8. The product stated both in bushels and pounds of cocoons, and of average number of cocoons to the pound, by weighing and then counting a bushel, or a peck. They should not be divested of their floss before being weighed, and the measure should be heaped. If flossed, it should be so stated, and then the measure should be even.

In addition to reports presenting the above facts, or as many of them as can be observed, (and of which many reports might be consolidated in one table,) it would add much to the value of any reports, that are otherwise full and complete, if accompanied by a minute diary of proceedings and progress, during the whole time of feeding.

An experiment may be very interesting and valuable, though it may not present half of the above particulars; and therefore we mean not to discourage the making and repeating observations, though much more limited than the most complete experimenting would demand. To make a complete experiment, or one embracing properly even *nearly* all the above particulars, would certainly be very troublesome. But it would require but 35 to 40 days, altogether, and the results would amply compensate the experimenter, by giving certainty to his subsequent operations; and the combined reports would be of far greater value to the public.

All persons who desire to make accurate experiments, on the *smallest* larger operations, as a matter of business, will do well to use eggs of some variety of worm known by experience to be of good quality, and, also, of medium or ordinary size. We object to all the "fancy" varieties of "mammoth" or others, for general, or for first operations, though we would advise others to do as we are pleased to do in that respect, that is, to try a few of any highly prized or new variety, and observe and compare them with the more common and known kinds. We repeat that above all things it is important to breed from a healthy stock; and no one ought to rely on eggs from an unknown or doubtful source, if he can possibly obtain such as are from a stock of known healthiness, and which have been properly kept. There will

be in market a glut of silk-worms' eggs, of some kind or other—and of all prices from \$2 to \$30 the ounce. Still, for want of a proper system being established, as to demand and supply, and the general want of knowledge and care for the preservation of eggs, even when of good and healthy stock, probably nine-tenths of all the good eggs will be spoiled, or lost by hatching on the hands of the holders, and yet perhaps nine-tenths of all buyers be supplied with such as were diseased, if not worse than worthless. Under existing circumstances, therefore, any person who has the proper knowledge and known ability, will render an important public service who will supply purchasers with good eggs at moderate prices. We have urged and induced our friend Thomas S. Pleasants to undertake this business to such extent as he can furnish a supply of eggs that he knows, and can warrant the good quality of. In pursuance of this suggestion, his advertisement will appear on the cover of this number. To all who know Thomas S. Pleasants, personally, or by report, it is totally superfluous to say, as we here do for the benefit of strangers, that any one who may send an order to him, either special or general, may rely, with entire confidence, on his careful attention and correct judgment, as well as in regard to the more important qualities to justify such reliance.—ED. FAR. REG.

ON THE CULTIVATION OF IRISH AND SWEET POTATOES.

To the Editor of the Farmers' Register.

Beaufort Co., N. C. Jan. 30th, 1840.

Having been successful for the last five years in raising good crops of Irish and sweet potatoes, I have concluded to accompany the subscription money with a short description of the mode of culture, &c., of those roots; which, if you think it will be of any benefit to potato growers, you can publish in the Register.

The ground preferred for Irish potatoes, and such as I have experimented on, has been stubble, grass, or old field, which for many years have been uncultivated and considered too poor (without manuring) to pay for working it. Early in the winter, or as soon after Christmas as possible, the ground is broken with a large two-horse plough; the first of March it is again ploughed into three-foot beds with a small No. 2 Freeborn plough; a deep furrow is then opened on the beds, which being nearly filled with manure taken from the compost heap, composed of leaves, virgin mould, or swamp mud, and a small quantity of barn-yard manure, the seed is deposited 8 or 10 inches apart, taking care to select good seed, and leaving from 2 to 3 eyes on each piece; after the dropping is completed they are covered by running a furrow on each side with the same plough; as soon as they come up and get 4 or 5 inches high, they are again ploughed, and with the hoe carefully "ridged

down," leaving the top bud out. Nothing more is done to them until we commence digging, which is generally about the 15th of May.

Many of my neighbors say this preparing compost manure is too much trouble. But permit me to say to those who have never tried the experiment, that the potatoes grown in this kind of manure are so much superior in quality they will never regret the trouble. I do not recollect of ever seeing a single potato with a black ball in the middle of it, which we too well know is often the destruction of whole crops raised in stable manure.

The sweet potato I have generally planted on the same kind of soil, which I prefer having broken up in the fall. The 1st of May the ground is again ploughed, forming lands by throwing 5 or 6 furrows together, and with the hoe we form a ridge or hill from 18 to 24 inches in height. The last spring I tried an experiment with manure from the drift thrown on the shore by the storm of 1838. The lands were opened by running a deep furrow with a large plough, the river grass and drift were placed in small piles two and a half feet apart, and over which a hill of earth was drawn. When ready for planting, a deep hole was opened in the top of the hill, and too good pieces of the plantings placed in it, taking care to separate the seed 2 or 3 inches in the hill. If a heavy baking rain should fall on the hills before the earth becomes settled on the top of the hill, we draw a small rake across the top, which breaks the clods and admits the tender bud to make its appearance. Before adopting this plan I had been often disappointed in my potatoes not coming up. The manure was put in every other row, and if I had not been present this fall when they were dug from the ground I could not have believed the small quantity and quality of manure could have made such a difference. I think the quantity was nearly double from the manured row over those having none; and I flatter myself the next crop of corn on these manured potato rows will be equally good. From this experiment I have come to the conclusion that coarse unrotted manure will return us more profit in applying it to the potato crop than any other, and will leave the ground in a fine state for corn the next year. J. B. M.

ON THE PROFITS OF SILK-CULTURE IN VIRGINIA.

To the Editor of the Farmers' Register.

I will venture to give your readers another short communication on the subject of silk culture; but as I fear many of them regard this branch of husbandry as a "duck and chicken" affair, and are indisposed to give it a careful examination, I now promise that they shall not hear from me again until January or February, 1841, when I hope I shall be able to communicate the knowledge derived from another year's experience. I do not wish to give to this business an importance that does not belong to it; but with Virginians, it seems to me, it should occupy the next place to wheat and corn, and that it should supplant tobacco. Abundant crops of wheat and corn are indispensable to our safety and prosperity. Merchants, manufacturers, mechanics, and professional men, cannot prosper if the crops of these necessary grains fail; and they should all unite cordially with

farmers in endeavoring to improve the condition of our agriculture. The cotton planters of the south, too, have learned from recent experience, the danger of neglecting the culture of corn, and they will no doubt profit by it.

I will now take up a question relative to silk culture, which is of the first importance, viz., can the citizens of Virginia and the old southern states compete successfully with France and Italy, in the production of raw silk? That we can compete with China and Turkey is proved from the fact that American silk sells for \$1 to \$2 per pound higher than that of China or Turkey.

The subject of manufactures, I am not prepared to examine; and I shall not attempt to show that we can compete with other nations in that branch of the silk business. Let us produce raw silk in abundance, and profitably, and we may safely leave the competition with foreigners, in the manufacture of silk, to our northern brethren. They will in due time adjust that matter with other nations, and become the purchasers of a large portion, and perhaps all the raw silk raised in the United States.

In the extracts from Young's Notes on the Agriculture of Lombardy, published in the Register, (Vol. 7, page 274,) there is a statement which I have found difficult to reconcile with other facts stated by Young; but as I think I have solved the difficulty, I will first give the extract to which I refer, and then my explanation, and if my version shall appear to you erroneous, I shall be pleased if you will correct it.

The extract from Young is as follows:

"The following is the account of the profit and loss of six ounces of seed, for three years, at Vicenza, by Sig. Carlo Modena.

I shall only quote the account for the year 1778, that being all that is necessary for my purpose.

<i>Expenses.</i>		<i>liv. s. den.</i>	
<i>Semenza</i> —seed, 6 oz.	- -	36	0 0
<i>Foglia</i> —leaves, 26,475 lb.	- -	1545	4 0
<i>Spesa</i> —gathering leaves and attendance.	- -	868	16 0
<i>Filare</i> —spinning 992 lb. cocoons, which give 159 lb. 5 oz. silk,	- -	557	18 0
		3007	18 0
<i>Produce.</i>			
159 lb. 5 oz. of silk,	- -	4144	15 0
Refuse ditto, 41 lb.	- -	102	10 0
Seed, 55 oz.	- -	330	0 0
		4577	5 0
Expense,	- -	3007	18 0
Profit,	- -	1569	7 0

1. The 6 ounces of seed is one-half of the large Italian pound of 28 ounces, or 14 ounces avoirdupois. Without this interpretation, the statement is utterly irreconcilable with other facts detailed by Young, and it is also rendered necessary by the product in silk, that being 106 pounds of 16 ounces, or about 7½ pounds of 16 ounces to each ounce of seed, which is a fair average of the silk crop in Italy.

2. The quantity of leaves consumed, was 26,475 pounds of 12 ounces, or 19,857 pounds of 16

ounces, the 14 ounces of eggs producing 400,000 silk-worms, which consumed about 50 pounds of leaves per thousand.

3. The consumption of leaves (19,857 pounds,) cost \$289 69, or rather more than a cent and a quarter per pound. Now, if Young reported correctly, and if the printer has not made a mistake, and further, if Sig. Carlo Modena did not make a false and wicked statement, (and self-interest did not call for it, but rather the reverse,) the culture of silk, with ordinary management, will prove nearly as profitable in Virginia, as in Italy, under the supervision of Modena and with a regulated temperature, and I predict that you will not sell 3200 pounds of mulberry leaves for \$4, unless you do it *pro bono publico*.

4. The *filare*, or spinning, includes with the reeling on the Piedmontese reel, twisting by the throwsting mill, to reduce the silk to what is called *organzine*. Both of these operations cost in Italy (according to my understanding of Modena's account) one dollar, to one dollar and sixty cents per pound, of 16 ounces, the expense varying with the quality of the cocoons. For example, the reeling of 90 pounds of silk (16 ounces,) in 1780, cost \$53, or about 60 cents per pound, and reducing the same quantity to *organzine*, cost \$85 or about 95 cents per pound. This operation is more expensive than reeling, but not only the actual expense of the operation, but a fair profit is added to the price of the silk. That the 106 pounds of silk, (16 ounces,) or 159 pounds (12 ounces, was *organzine*, is evident from the price named, which is equivalent to \$7⁷⁵/₁₀₀ per pound of 16 ounces.

The price of reeled silk or raw silk at that period in Italy, according to Young, was about \$6 per pound of 16 ounces.

5. The cost of gathering leaves and attendance was \$162 or about \$11 50 per ounce of seed. For \$11 50 per ounce of seed, silk-worms can be raised in Virginia with hired labor, and using the *morus multicaulis* in the hedge form, or about \$1 40 for each pound of silk. Now, if we will take an acre of poor land that will sustain the worms from 2 ounces of eggs, and produce 16 pounds of silk worth \$80, and deduct \$23 for rearing the worms, \$16 for reeling cocoons, and \$10 per acre for cultivation, it will leave a net profit of \$31 per acre. The expenses named, are larger than necessary, especially the cultivation of the trees, and the product moderate, and yet it shows a profit sufficiently large, to prove that this culture would enrich Virginia if pursued by our farmers on a small scale, and in subordination to crops of grain, hay, &c., which are indispensable.

6. Sig. Carlo Modena paid for seed \$7; for leaves, \$289; for spinning or reeling, and reducing to *organzine*, \$103; for gathering leaves and attendance, \$162; and yet realized a profit of \$294 from 14 ounces of seed, or \$21 per ounce. If this is not a fable, (and who will show that it is?) the culture of silk is of incalculable importance to Virginia, and the old southern states. There is no need of retreating from poor lands any longer; and I say to all farmers who can conveniently spare land and labor, plant mulberry trees of the best varieties, and take care of them. The time is near at hand when it will be seen that they constitute valuable property. The country will not be overstocked with them for years to come, if

they should be appropriated to their proper use, the production of raw silk.

LAYTON Y. ATKINS.
Stafford County, Va., Feb. 1940.

PREMIUMS AWARDED BY THE AGRICULTURAL SOCIETY OF CHARLOTTE.

For the Farmers' Register.

The editor of the Farmers' Register will please insert the following premiums awarded by the Agricultural Society of Charlotte, Virginia.

To Henry A. Watkins \$5 for the best brood mare, Ebony by Roanoke, dam by Bluster. Also \$5 for the best two-year old filly, by Emancipation, dam Ebony.

To John Marshall \$5 for the best two-year old colt, by Emancipation, dam by Roanoke. Also \$5 for the best one-year old colt, by Emancipation, dam by Roanoke.

To Hilary Richardson \$5 for the best suckling colt, by Shark, dam by Medley.

To Thomas E. Watkins \$2 50 for the best saddle horse.

To Col. J. P. Marshall \$2 00 for the best milch cow, Scott, three-fourths Durham. Do. \$2 00 for the best beef. \$2 00 do. for the best three-fourth Durham heifer, and also \$2 00 for the best ram.

To Major Wm. Gaines \$2 for the best bull, Tom Powell, by Medley.

To Hilary G. Richardson \$1 00 for the best boar, of the Berkshire breed, and \$2 for the best Berkshire pigs.

To Col. J. P. Marshall \$2 for the best brood sow.
R. J. GAINES, Sec'y.

REMARKS ON DIFFERENT SCHEMES OF ROTATIONS.

To the Editor of the Farmers' Register.

Not many years since, a controversy was warmly manifested in your journal, between two parties of agriculturists on the lower James River, on the comparative merits of the three and four-shift systems of husbandry. Among the most distinguished of the disputants, was Mr. Hill Carter of Shirley, than whom no one in our state enjoys, or is entitled to, a higher reputation as a farmer—as far (at least in my judgment) as consists in the carrying out, and thorough execution of his plans; for which he possesses in an eminent degree the advantages of a fair theatre, extensive means, industry and intelligence. I observe in the December No. of the Register, (the last I have received,) a communication from Mr. Carter in which he condemns his favorite four-shift rotation. This, I have long been prepared for, though I am sorry to find that the unfavorable result of his experience has been ascribed by us to different causes; leading him as I see to reserve the most objectionable feature of the system he abandons; I mean the three successive grain crops. This, I am the more surprised at, that the object aimed at is to get rid of insects; particularly, I presume, the chinch-bug, which is undoubtedly the greatest scourge that has ever visited the crops above the falls. This insect feeds exclusively on grain crops

as long as there is the least succulence in them, and then preys on the spear grasses which grow among them; never, that I have seen, touching clover. But the nursery afforded for three consecutive years to insects, is not the greatest objection (perhaps) to the system. I believe that to keep up the supply of pabulum necessary for any crop, but particularly wheat, it is important to alternate plants of different characters, as well as to introduce an ameliorating crop as often as can be done with an eye to the desideratum with all proprietors of the soil; I mean, advantage to the land as well as to the purse. To this end, none is so convenient or useful as clover, none so well calculated to arrest the encroachments of pests, both of the animal and vegetable kingdom, or of poverty, that most depressing of all evils.

I have always considered the "*beau ideal*" of an improving, and at the same time profitable system, the *five-field*. But not with Mr. Carter's rotation; in this we differ radically. Not only as regards the consecutive crops of grain, but of clover and the *kind* of grain which follows it. Under Mr. C.'s rotation, wheat succeeds the second year's crop of clover. This I think is objectionable on account of the pests which spring up in the second year of the maturity of clover. If for the sake of improvement to the land, or for grazing, I wished to give two crops of clover to a field, I should do so under a six-field course, viz., clover, clover-pasture, corn, wheat, clover, wheat. This is undoubtedly one of the most improving and profitable systems to the grazier and farmer, who have large tracts of uplands. But to the farmer, (without the other branch of the profession as with Mr. Carter,) and much less to the farmer and planter as with us, it will not answer; at least, I speak for myself. To return from a digression to my perfection of a five-shift rotation, i. e. clover, corn, wheat, clover, wheat. This gives two fields of clover and two of wheat, with the advantage of a regular alternation. The stubble fields to be gleaned by hogs, and moderately trampled by cattle—the first chiefly for the benefit of the hogs, the latter of the clover, which is the better for having the earth settled about it before the winter's frost sets in; and in puffy lands is also measurably protected from the usual drought of July and August.

Both clover fields to be moderately grazed* after the 20th June the second year, by a stock only sufficient for the purposes of the farm—the field for fallow first. The two fields thus afford grazing enough for the stock, and have left on them more clover than is taken off—trampled too to a degree, which is beneficial to the succeeding crops, as well on account of the settling of the clover, facilitating in some measure the operation of ploughing, as from the pressure of the hoof promoting the productiveness of the soil; for I agree with Mr. Carter in the opinion that some trampling is indispensable to a good product in wheat. To this system, as to all others, I consider a standing pasture an important aid, even though it be such a one as I have attached to a three-field course, which a friend (Dr. J. M. M.) characterizes a *short bite*. Being large, this serves my stock, with the aid of lots for favorites, until

* Unless one is reserved for cutting hay and seed from.

the clover field is ready, and afterwards for its relief in wet weather.

These remarks, Mr. Editor, although drawn from me by my friend Mr. Carter's communication, are by no means offered as a commentary, and I am sure will be received by him in the spirit they are written. He very properly is actuated by a sense of duty to a community which justly looks to him as a bright exemplar in our profession. I, by an assumed obligation as a subscriber to your Register, to express freely my views on agriculture, that may (for what they are worth) at least elicit discussion on a subject which wants light.

RIVANNA.

THE FIVE-SHIFT ROTATION.

To the Editor of the Farmers' Register.

Chericoke, Jan. 15th, 1840.

I have now for some years been experimenting on the different rotations, of the three, four, and five-field systems, and although my experiments have not been of sufficient duration to arrive at conclusions, that may be as satisfactory as they would have been, or as I think they will be at a future day, and I had not designed communicating their results until I had carried them further; but being so entirely convinced myself, and seeing that some of my James River friends have altogether come into my views, thereby removing heavy authority against me, I have not deemed it necessary longer to delay what was my intention at a future day. For surely whatever can be done for lowland Virginia farming, should be done quickly; and although I doubt if many, or indeed any, will be so far satisfied by the results of my experiments, as to adopt my views instead of their own, still I think it my duty to communicate that from which I have derived benefit, and others may, if any will practice, and at least my testimony may strengthen that of others, entitled to more weight.

In 1824 I moved to the place where I now reside, and commenced farming. I found the farm cultivated after the then universal mode followed in this section of country, the three-shift system, to use the provincial term; (if they had called it the make-shift system I dare say it would have been a better one.) This system, if system it can be called, I followed up diligently for some years, making and using all the manure the farm afforded, and this was what we called a good deal, and all other means which I then knew of, for enriching land. But notwithstanding all my efforts, to my surprise, I found my crops did not at all increase, the corn crop remaining at about the same as when I took possession of the farm, and the wheat crop evidently, I think, declined. Finding that my income did not at all answer my expectations, and not likely to answer my wants, I determined after giving the three-shift system, as I thought, a fair trial for 7 or 8 years, to abandon it, and at once to cut each field into two, so making six fields out of the three. One I kept as a standing pasture, to aid the other field which came into pasture in the regular rotation of the five-field system, which I then determined to adopt, following one each year for wheat. This is now the beginning of the 8th year since I commenced this system, and the one-sixth produces more wheat,

or corn, or grass, than the third formerly did. My land has been regularly improving, as well as my crops and income from the farm. I do not know but that the income of the farm is approaching to double what it formerly was. I should add though, that for the last five years I have been marling, by which my land has been greatly benefited; but, as I shall presently show, the improvement is not altogether attributable to the marl; as I have another farm under a different system, where marl has been much more freely used than the one on which I reside, which has not improved in the same ratio at all. When I decided to change my practice of farming, or to innovate upon the old three-shift, I reflected maturely upon the several systems that were followed in different parts of the country. I first brought in review Arator's four-field rotation, but the results I had witnessed from that course I was not well pleased with. 1st. Because the land gave no adequate return in small grain; and 2dly, because I was fully satisfied in my own mind, that the full benefit from clover could not be derived, unless the crop was turned in at maturity, that is, in the way of summer fallow, before the substance of the plant was all, or nearly all, washed away by repeated rains, and evaporation. From my experience I should say, the most judicious time of turning in the clover crop was when the first crop had fallen and dried, and the second had arrived at full maturity, the head ripe enough for seed, but the plant not dead. The substance of the first crop still mainly in the stalk, and the second in its recent state, thereby deriving the full benefit of the dry and green crop.

I next thought of the four-field system as pursued by some distinguished farmers on James River; but this too to me had very strong objections, notwithstanding the very high encomiums passed upon it by some gentlemen of known talents and skill as practical farmers, and whose experience and correct observation was much beyond any thing I could pretend to lay claim to. Indeed such was my confidence in those gentlemen, that I was at one time almost tempted to yield my own opinions to theirs; but I could not be convinced but that three grain crops in four years, was too severe a rotation for almost any land to bear, unless it was already rich, and a good dressing of manure could be applied to each crop, which I knew could not be done in our country, and that although it might answer on the more fertile lands of the James, I was well aware that on the sandy soils of our Pamunky flats, it would not. I was always too fully persuaded that the sandy nature of our lands required grazing once in the rotation, for the double purpose of cleaning and trampling the soil, thereby rendering it more compact, and retentive of moisture and manure. And again, our light, warm soils, however deficient they may be in the production of natural grasses when enclosed, are certainly not in weeds, which I am yet to be convinced are of any benefit to the land, that is, that they do not take from the land more than they give back, unless it is as pabulum for marl or lime to act on, as vegetable matter is essential in some shape for the well acting of calcareous matter. But when superadded to my own views and opinions, I saw from a statement of John A. Selden, esq., of Westover, that a farm in Curl's Neck, which had the advantage

of being originally good land, and I knew had been cultivated by good and judicious farmers, in 19 years had only arrived at 7 barrels of corn per acre, under this, his favorite four-field fallow system, I abandoned that also. I then determined that the five-field rotation was the shortest upon which any judicious system of agriculture could be based, and this I now believe too short by one.

My rotation is, 1st, corn, 2nd, oats and wheat, enough of the former for the use of all the horses, &c. on the farm, then by selling that amount of corn, oats being a more certain crop after corn than wheat, 3rd, clover, and fall fallowed for wheat, 4th, wheat, and this spring I sow orchard and other grass seed with the clover for pasture the next year, 5th, pasture, and as soon as I can improve my standing pasture sufficiently to bring it into the regular rotation, I shall say, 6th, pasture. I would lengthen the rotation, first, because I do not think the one field will support a sufficiency of stock to consume, or convert into manure, the stuff made on a productive farm, and secondly, I do not think that 18 months, the time from coming off the oats and wheat, to its being fallowed for corn, is long enough for the reformation of the soil after the grain crop rotation, which I think is, or should be, a *sine qua non* in all rotations, as all who have paid any attention to soil must have noticed the natural tendency of all land to approximate the soil near to the surface, as it is dependent upon light and atmosphere for its formation; and in my opinion the plough should not again be brought into action before the sod is reformed, which will be in two years, in any land that is in any tolerable condition. And this reformation of sod is, I think, the test of reformation of soil. In the rotation as lately suggested by my friend, H. Carter, esq. of Shirley, the latter object may be attained to a certain extent, but not I think fully. The objection to his rotation, with me, is bringing three grain crops together, and the one field will not afford a sufficiency of pasture, for a sufficient quantity of stock. I am aware that the opposers of lengthened rotations will bring up Flemish and Chinese husbandry, and may be that of other countries, to prove the superiority and greater profits of the shorter; to those I would say, that with their soil, climate, and circumstances, theirs is doubtless the best system for them. But in all these matters, our situation is widely variant from theirs. I speak only of the county with which I am acquainted, and in which I have operated as a farmer, in the tide water district of Virginia, and what I say is the result of experience, and the best observation my judgment enabled me to make. Others I have no doubt will say, why I sha'n't live six years: that may be; we none of us know how long we are to live. To such as expect to die soon, I would say, lay a good foundation, that your posterity may raise a superstructure upon. To those who advocate the entire non-grazing system, I would remind, in addition to what has been already said, that the weeds, grass or whatever it may be, that is depastured off, is not taken from the land, but is returned in the shape of manure, having passed through the animals; which I should think was much better calculated for its improvement, than a rank growth of weeds, which will have lost the greater part of their fructifying properties by exsiccation and evaporation, before they are return-

ed to the earth. As to the popular notion of covering land being one of the means of improving, it may be true to a certain extent, but certainly not to the degree ascribed to it by some; for if you cover land for several years, and then expose it to the sun in the cultivation of a corn crop, it will not produce so well, as that which has been more exposed, as it will not stand a drought at all, nor the common summers' suns, half as well as land around it which has been less protected; this I have seen fully proved. I therefore infer that land requires acclimating as well as animals, and that if it has to be exposed in the cultivation of the crop, it should not be too much housed at other times. I would also here remark, that I have never succeeded in getting a good stand of clover upon light land, that had not been trampled, notwithstanding it may have been well marled.

I hope none will infer from what I have said, that I am for giving back nothing to the earth in the shape of vegetation, as they will recollect that there is in the system recommended by me, no regular grazing until the fifth year, by which time, as I suppose, the land will become as it were saturated with vegetable matter, and that it is now time to leave it in the earth to become converted into soil. And I would recommend in addition to the clover, &c., a practice that I have followed sometimes with very great benefit, that of sowing the corn land that is to come in wheat, the last time it is worked, in black-eye peas; it will generally give a good green lay, which I think gives to the land about as much as the corn crop takes from it; indeed I have never made a good crop of wheat after corn, except upon a pea fallow. The peas to be sure will not arrive at that maturity, in all seasons, that is desirable before being turned in, but upon good land with a fair season, the growth is generally as much as can be turned in with convenience. It has also the good effect of interposing a leguminous crop, between the two grain crops, as well as that of keeping the land clean of crop grass, the nursery of Hessian fly.

My objections to the four-field system of Arator are not altogether theoretical. With the James River practice I have had no practical experience; but with the first I have, having had under my management for some years a farm which has been cultivated in that way, saving the entire exclusion of stock, although not heavily grazed, and the improvement has not been at all commensurate with expectations. But that certainly is better than the horrid land-killing, profit-starving, three-shift system of lower Virginia. It is true, some have succeeded pretty well with Arator's system, the late Mr. Lewis of Weyanoke, perhaps, better than any one else that has come within my knowledge; but with his judicious management, and eternal manuring, any system would have answered well; but even he did not succeed to any extent before he commenced the use of lime; as in frequent conversations I have had with him upon the subject, he never spoke of the product of any other than his limed land. However successful though some may have been with this system, it does not prove that they would not have been much more so with another, under equally good management. Another unanswerable objection with me to the entire non-grazing plan is that there can be no good system of husbandry which does not raise a sufficiency of stock

of all kinds for the use of the farm, and for the profitable conversion of all the offal into manure.

In the foregoing part of this communication I promised to say something of another farm, upon which I had been following a different rotation from the one on which I live. I will now advert to it. Coming into the possession some 8 or 9 years ago of a farm higher up the river than where I reside, the land being every way equal, naturally, where marl is abundant, and timber scarce, and thinking that perhaps the three-shift system with marl had not been fairly tried, and anxious too to test it with the five, 4 or 5 years ago I determined to do away with all cross fences, and expel the hoof entirely. The fields have now been marled mostly a second time, and the growth of weeds, magothy bay bean, &c. &c. excessive; but the clover does not take as well as it did some years back, indeed the bean smothers and kills the young clover. The corn crop has not improved for several years, and it has nearly ceased to bring wheat; and although under much more favorable circumstances, as to vegetable matter and marling, than the place I reside on, (for a considerable portion of it is still unmarled,) which, as before stated, has been under the five-field rotation for eight years, fallowing for wheat, and grazing the field the year before it comes in corn; the improvement of the soil, or crops, is not at all equal. I think the experiment conclusive as to the merits of the two systems, I shall therefore abandon the one and adopt the other. Nor do I think it matters as to the size of the farm, whether or not we adopt the summer fallow; for if it is correct upon one scale, it must be upon another. But my remarks are not intended to apply to lands that are so light that they will not bring wheat under any course of culture, or management; nor to particular climates or situations, where wheat will not grow; but to the corn and wheat growing districts to which I am accustomed.

Should any be disposed to innovate upon their old three and four-field habits, but are deterred by the fear of losing their income for the first rotation, I can assure them from experience they need not fear it; the increase of the wheat crop will more than compensate for the loss of the corn in the first five years, and after that the one-fifth will produce more of corn than the one-third did. Presuming always that clover is raised wherever the land will produce it, and all convertible matter turned into manure, and applied to the land; and marl or lime, if to be had, to be also used. I would here remark, from what experience I have had in farming, that however valuable putrescent manures may be, and indeed indispensable as they are, that no high grade of product can be expected, upon other than naturally rich, or at least, neutral soils, (that is, when there is no excess of vegetable acid,) without the use of calcareous manures in some shape or other, whether of marl or lime. I do not think that the use of lime as a manure upon our acid soils is sufficiently appreciated, notwithstanding all that has been said and written upon the subject. I think that we can afford to give much more for it than is generally supposed we should be warranted in doing. The only way to test the real value of lime, is to compare the product of land before and after its use with clover; for without the judicious use of clover, with marl or lime, it is impossible to arrive at

its full benefit, and when that is done, I will warrant that the increase in the two first crops will more than repay any reasonable outlay that may have been made in lime and clover seed, to say nothing of the permanent improvement of your land; and surely we can't lose by borrowing at 6 to receive 12 per cent.

I am pleased that my friend, Mr. Carter, has varied his rotation from mine, that actual experience may decide the relative merits of the two; whether it is best to bring the three grain crops together, and to depasture the clover before fallowing for wheat, or to interpose the crop of clover between the grain crops, and turning it in, in the recent unpastured state, and grazing before corn. His rotation will have the advantage of mine, as to the five-fields only, in having two years to lay without being disturbed by the plough, that the soil may be the more perfectly reformed; but whether that will compensate for the quick succession of the grain crops, and the loss of the green clover lay, can only be known by actual experiment; as experience, after all, is the only correct teacher. In all other respects our views correspond entirely, and I feel highly gratified at having so able a coadjutor, as his experience is greater than mine, and his authority much more entitled to respect.

Respectfully,
C. BRAXTON.

TREATMENT AND FOOD OF GROWING STORES.*

Store pigs, says Mowbray, may generally be fed on almost any sort of food which they will eat, and thus acquire growth; and then for six weeks or two months before they are slaughtered they should be fed on grain and milk which will harden and give flavor to the pork. Through the winter their food will be the run of the barn yard, roots of all kinds (of which every farmer should have a plentiful supply) including ruta бага, and cabbage, with occasional rations of grain of some kinds with wash. In autumn and in a plentiful season swine will subsist on acorns; and in summer on clover, lucerne or tares. Swine turned to shift upon forests or commons are apt to stray and hide themselves for a considerable time; the ancient and ready method to collect them is by the sound of a horn with which they have been accustomed to be fed. Feeding pigs, says Low, are fed on green food of all kinds; and hence clover, lucerne and tares may be employed in feeding them in summer, though to fatten them finally some farinaceous or other nourishing food will be required. They will also graze like sheep and oxen, but grass consumed in this way is not the natural food of the animal, which consists of roots rather than herbage. The feeding of pigs on herbage is merely to carry them on for a time till more fattening food can be procured. When fed on herbage a ring should be passed through the cartilage of the nose to prevent their following their natural instinct of ploughing up the ground, but the same purpose may be more effectually served by divid-

* From the "American Swine Breeder, a practical treatise on the selection, rearing and fattening of swine. By Henry W. Ellsworth. Boston 1840."

ing the tendons by which they are enable to move the snout.

"There are two purposes," continues the same author when describing the mode pursued by raising small stocks on some of the English farms, "for which pigs may be fattened. The one is to yield pork which may be used either fresh, salted or pickled; and the other is to produce bacon which is prepared by salting and drying the flesh. When fed for pork, which is the most convenient system in the practice of the farm, the pigs may be reared to the age of six or eight months; when intended for bacon, they must be reared to a greater age and size, as ten or twelve months. When the object is pork, the smaller pig is to be preferred; when bacon is desired the larger class should be cultivated."

In the case of feeding for pork alone, it has been computed that upon a regular farm, with a supply of tares and clover to the animals in summer, and of potatoes and turnips in winter, and with no other feeding than the refuse of the barn, milk house, and kitchen, one pig may be fattened in the year for every six acres of land under corn crop. Thus supposing there are to be 240 acres in corn crop, the quantity of pigs fed annually upon the farm might be 40. To feed this stock, in addition to what they can pick up in the straw yards, about an acre and a quarter of clover, and an equal quantity of potatoes will be sufficient. To keep up the number three breeding swine will be required, of which two should be sold each year, their place being supplied by an equal number of younger ones reared upon the farm. The surplus beyond the quantity of 40, which it is proposed to feed may be disposed of when weaned. This is a method of management practicable upon ordinary farms, *without any interference whatever* with the food and attention required for larger stock.

Another method of management may be adopted. This is to take only one litter of pigs from each sow, to sell the pigs as soon as they are weaned, and immediately afterwards to feed the swine. This will be a profitable species of management provided there is a sufficient demand in the district for so many pigs when weaned.

Mr. Henderson, in his Treatise on Swine, recommends this system. He calculates that one sow for every seven and a half acres may be fattened in this manner. He proposes that the breeder shall purchase in the first place twenty sow pigs and one boar pig which had been born the beginning of June. In the following June all the females will have had pigs. These they are to suckle for about two months. The pigs are then to be sold just when weaned, except twenty-one, namely twenty sow pigs and one boar pig; these being selected from those which are of the handomest shape, so that the subsequent stock may be kept good and uniform. The farmer will now be in a situation to go on without further outlay of money for stock. In a month after the pigs are weaned and sold, the sows themselves are to be put up to feed. This will be about the beginning of September. The male must then be admitted to them so as to render them quiet and apt to feed, and in two months they will be fat and of a large size.

Now the introduction of a practice similar to this by the cultivators of many of the large farms

in the western and other portions of the United States, would be attended with great advantages. It is at once a simple and convenient method, of deriving large profits, from what is generally neglected as wastage—the remaining fodder after the crops have been gathered; and it exhibits most conclusively the good results of endeavoring to *make the most of every thing*. The more general cultivation of the corn crop, and the cheapness of grain, would allow the keeping in the country, of even a larger number than those proposed, at a very trifling advance, if any, in the expenses.

The whole system of European agriculture, and the modes of feeding stock, differ essentially from the practice of this country, and the desirable object there, is often to avoid the use of many articles for food, which the exuberance of our soil renders economical. But a detail of the practice pursued by judicious cultivators, is always valuable for important truths of general application.

Where swine are suffered to range for a great portion of the year, and are confined in the winter to barn yard or small enclosures, Mr. Young advises that the whole number of hogs should be looked over in the month of May, and sorted; such as have attained half or more of their growth, being drawn and turned upon lucerne or clover crops, where they should be kept until the end of September, care being taken that the fences are in good order, and that proper ponds, and other places are provided for the hogs to drink at. Under this management they are found, he says, to grow rapidly, the food in general agreeing well with them, and they are then taken up in excellent condition for fattening. In this mode the hogs sufficiently grown are selected from the sows that have pigs, and weaned pigs, and only the latter left to be fed with the dairy or other wash, with suitable green food, such as lettuces, cabbages, &c., by which a much larger stock of breeding hogs may be kept. The cabbages may be used for the sows that have spring litters, and the lettuce for those that have autumn litters. It is observed that these plants are of great use for sows and pigs, promoting the increase of milk in a great degree, affording assistance where the dairies are small. From the sweet juicy quality of the lettuce, the hogs are not only extremely fond of it, but it becomes highly nutritious. In this way the swine may be well supported, and carried forward till the stubbles are cleared, when they may be turned upon them, and thus the whole year be provided for, in these different ways, with the greatest economy.

REMITTANCES BY MAIL TO PUBLISHERS MAY
BE FREE OF POSTAGE.

"A Postmaster may enclose money in a letter to the publisher of a newspaper, to pay the subscription of a third person, and frank the letter, if written by himself."

AMOS KENDALL,
Postmaster General.

The above extract has been latterly published in nearly all the newspapers and other periodicals of the United States, and there is as much reason why it should be as fully known to our subscribers

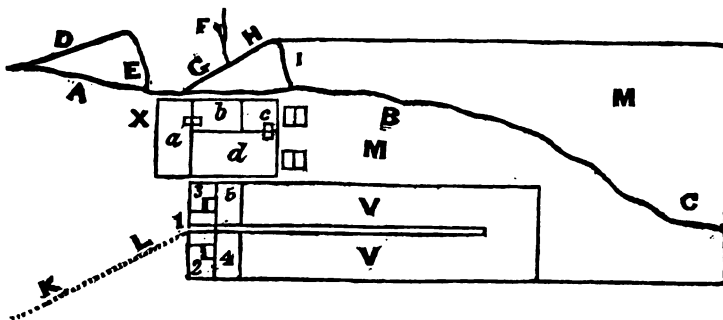
as to others. It will be seen that by availing of the right, many of our most careful and conscientious subscribers may save themselves the expense, which many of them pay, of postage on letters containing remittances for subscription—and that others, less careful and scrupulous, who subject the publisher to that unjust and heavy tax, may thus easily save him as well as themselves the cost. It is presumed that no postmaster will be so churlish as to refuse to write his signature to oblige his neighbor. All that the latter need contain to be perfectly explicit, and to come under the above regulation, and which may be written in advance by the subscriber, to save the postmaster even that little trouble, is contained in the following form :

"§———— enclosed, on account of subscription to Farmers' Register for A. B., now received at [or to be sent, if a new subscriber, to] ————— P. O."

As short as is the above form, it contains essential information that is very often omitted in letters containing remittances—that is, stating at what post office the subscriber is then receiving the pub-

lication. For want of this information, (when the remittance is sent from another than his usual post office, or by private conveyance,) it is often very perplexing, and sometimes impossible, to find the proper address of the individual payer; and sometimes errors have been committed, by giving credit to another person of the same name—and still oftener, by supposing the payer to be a *new* subscriber, and therefore sending another copy of the work to the post office, which, by the want of precision in his order, was incorrectly supposed to be his proper address. This source of error is still more increased by the names of subscribers, or their post offices, being often incorrectly given in by those who are charged with handing in payments. In all such cases the fault is the subscriber's, and yet the loss is the publisher's. A little more care and precision in giving orders would save a deal of difficulty and loss to the publisher, and sometimes of dissatisfaction and displeasure to the subscriber, on account of mistakes for which he considers the publisher entirely chargeable, when in fact it was owing to his own want of care, or of those to whom he entrusted the conveyance of his payment.—ED. F. R.

FARM-YARDS. MEADOW. MANURING. PRESERVATION OF TIMBER. FLESH CONVERTED TO MANURE.



For the Farmers' Register.

The above is a fac simile of my horse and cattle yards, meadow, natural streams and conduits. These have been constructed and used about six years, and I cannot conceive how they could be improved, either as relates to structure or economy. A, B, C, is a natural stream running through the centre of meadow; F, is another natural stream, which is emptied into the centre of the reservoir, G, H, and thence into the larger stream, A, B, C, either through H, I, or G, as required. In this reservoir is caught the mould and vegetable matter brought in by the stream, F; also when the stream A, B, C, is smaller, it flows through G, H, I, and deposits mud. The reservoir is nothing more than a ditch about 130 feet long, 8 feet wide, and when empty 5 feet deep; yielding when excavated, and annually afterward, about 175 ox-cart loads of rich mould. Finding

this mould very valuable as a manure, particularly when composted in the stock yards, I have determined on cutting another reservoir D, E, on the stream A, B, C, of above double the length of G, H, which will yield about 350 loads annually, all of which being adjacent to my yards, a meadow, and four grain fields, I can with but little labor, use when and where I please.

At F, there is a spring of good water, which is conveyed under ground by means of bored logs to a stop faucet marked X, where it is taken as required for domestic purposes. Thence the water continues under ground to an open faucet, and falls into a trough, one-half of which trough is in the horse yard (a,) and the other half in the cow yard (b). Inside of the cow yard, the water descends into another set of bored logs and is conveyed to another trough, where the calves (c) and steers (d) drink. From thence the remain-

ing water is used on the meadow. The walls of the yards are posted and closely planked, about eight feet high; the openings in which, as exhibited, are gates.

I am making arrangements for a piggery, on the plan here exhibited. 1, is the boiling and vegetable house; 2 and 3, are apartments for sows and pigs, and a boar; 4 and 5, for store hogs. The doors of the boiling house, the passage between 4 and 5, and the passage through the garden, to be in a direct line; so that a hand-cart can be conveniently used. The spring F, not affording sufficient water for the piggery and meadow, I intend to convey under ground, through bored logs, by the way of the dotted line K, L, the wanted supply; to be served first to the hogs, then to the garden or meadow, or pools presently to be mentioned. By raising a head of a few feet at the start, a bore of two and a half inches will afford abundant supply. I have already an open ditch in the direction K, L, for the purpose of conveying the creek water, when wanted, to an adjacent field; yet for several obvious reasons, a covered conduit is required for the use of the piggery.

To the intelligent, all the above is plain sniling; but connected therewith, I have another project in my head and heart, which is worthy of development; but confessing my inability, I call on you, Mr. Ruffin, and my neighbor, Professor Armstrong, and any, and all others, whom either interest or charity may prompt to assist me. We all know that any given quantity of putrescent matter, will finally produce its equivalent; and is it not time that the farmer had learned to husband all his funds, instead of dissipating them for the benefit of the deserts? Can it be more decent or profitable to gather the stale excrements of man and other animals, and prepare these for manuring grounds; than to prepare and thus use the carcasses of cows, sheep, horses, &c., which may die?

I have as good luck as my neighbors, yet in the course of the year I have four or five cows and horses, and from 40 to 50 sheep and lambs to die, which have heretofore been cast on a waste, and suffered to evaporate. These when alive were perhaps worth \$150; now first, when dead, if judiciously prepared and used as manure, what is their value? and secondly, what is the most judicious preparation?

In answer to the first question I would merely remark, that it were absurd to say that the death of a brute is a loss to the world; and I suppose it equally absurd to assert that the owner cannot devise a method of appropriation which shall remunerate him for the loss. If a barrel of corn be ground and applied to the earth as a manure it will yield an additional barrel of corn. If, instead of applying the meal to the earth, it be fed to an animal, it will produce its equivalent in flesh; and if this flesh be fed to another animal or to the earth, it will again reproduce its equivalent. It is true that the atmosphere must and will have its share of all putrefying matter, but as it receives so it gives. It is also true that for the mutual prosperity of animals and vegetables, there must be a perfect equilibrium of the two materials; but most likely it is not in the power of man to regulate the balance: at any rate it is my strong desire to hold on to my matters, particularly to the flesh, as I consider it the most valuable.

By looking at the lower end of my cattle yards it will be seen that I have marked two pools; in these I propose depositing and preparing my dead carcasses for manuring my meadows. For this purpose must I use lime, ashes, potash, or other alkali, in connection with the urine from the yards, or with common water, or what? It is desirable to have it in a liquid state, and that the bones as well as the flesh be dissolved. I propose two pools to each yard, as exhibited, connected at bottom by auger holes; casting the carcasses into the uppermost, and when to be emptied, drawing from the lowermost; and if any matter should remain undissolved, more alkali and water to be added.

I deem it worthy of promulgation to state, that about twelve years past, I chopped a quantity of old field pine limbs, about six inches long, letting them remain in a pile till I thought they were half rotted, when they were carted to my cattle yard and attempted to be composted; but, to my surprise, they were preserved by the urine, so that I can to this day find them on a meadow as hard, and apparently as sound as when growing. This experiment proves that posts of any kind of wood may be made as lasting as locust. The draining from any horse or cow yard, can be led into a wooden or earthen pool, and the posts deposited therein will be saturated. MOUNTAINEER.

December 27, 1839.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

Navigation is restored to our late ice-bound streams, and is rapidly being restored to those north of us; while, at the same time, the rivers of the south-western states, after a long period of drought, have again become navigable. Immense supplies are now poured into market by these channels; and an active business prevails in all kinds of produce, but at comparatively low prices.

The British steam packets have been deterred from prosecuting their regular trips during the winter; and the New York packets being retarded by adverse winds, we are without recent intelligence from Europe.

In the tobacco market there is little variation this month. The quantity brought in for inspection is large, but readily finds purchasers at \$3 to \$4½ per hundred for lugs, and \$4½ to 8 for leaf. Fine qualities (suitable for export, in leaf,) do not yet appear. The supply consists chiefly of the lowest sorts, as usual at the commencement of the year. There is no foreign export.

A good demand has existed for flour, both for foreign and coastwise shipment. Supplies have been large and sales commensurate—price \$5½ to 5¾—with a prospect of decline, particularly when supplies from the west can arrive freely. The quantity to be received from thence is very great, and requires an extensive foreign demand to absorb it. In Ohio wheat is selling at 40 to 50 cents per bushel; flour at \$3½ to 4; and corn at 20 to 30 cents. In our markets wheat commands 108 to 115 cents. Corn 50 cents. Shipments of bread stuffs to a large extent are made to England, and some to France.

Supplies of cotton are now pouring in to all the southern and western ports at an unprecedented

rate. At Mobile 44,000 bales arrived in one week, and the receipts to the close of next month will exhibit a quantity surpassing all exportation at the opening of the season. Prices with us have undergone little change, and the current sales are at 8 to 9½ cents. In the large southern and western markets 5 to 9 cents.

Sugar from New Orleans is sold in the Atlantic ports at 5 to 6½ cents, and if in bad condition at even lower rates.

The banks in this state, as in some others, are relying on the clemency of the state legislatures, and on their action will depend whether many of the charters be relinquished and the institutions closed. The stockholders are less interested than the community in the result.

Exchange on New York 7 per cent. premium, on London 15, on Philadelphia and Baltimore ½ to 1 per cent. premium. X.

February 22.

NITRATE OF SODA AS A MANURE.

From the Farmers' Cabinet.

In the last number of the Cabinet there is a paper from the Farmers' Magazine, stating the mode of application and uses of this article as a manure, all of which has been verified by the writer of this, last season, though he had not then heard of its application to agricultural purposes either in Europe or this country. It costs from three to four cents per pound by the sack, and is much cheaper than saltpetre. It should be sown early in the spring on the grass sod at the rate of about one hundred pounds to the acre, and perhaps a heavier dose might answer better, but experiment must determine that point.

The nitrate of soda, or cubic nitre as it is often called, can be purchased in quantities of the wholesale druggists. It exists naturally, in inexhaustible quantities, in the desert of Atacama in Peru, South America, from whence it is imported into this country, and is used for various chemical purposes. It forms a bed of variable thickness, covered with clay, of one hundred and fifty miles in extent. This article in the crude state in which it is imported into this country, is in dirty-white saline lumps, rather soft and friable, and damp on the surface. It attracts moisture from the air, and dissolves very readily by exposure to rain.

From present appearances, it seems probable that this substance will soon be found to be of great importance to the farmer as a manure, and the ease with which it can be transported will be a means of extending its benefits; and the greater the consumption of it, the cheaper it will become, as it will then become an object of commerce on a large scale.

If a number of farmers in different sections of our country would make an experiment the coming spring with the nitrate of soda, and communicate the result for publication in the Cabinet, great good might arise from it, and for the encouragement of those who are disposed to try it, the writer of this can vouch for its efficacy in promoting the growth of grass. It would be well to try the effect of it on corn, applied in small quantities on the hill, and also on potatoes.

New manures which admit of easy transportation to distant places at a cheap rate, are invaluable to the agriculturist, and ought to be sought after, and brought into notice by all who desire the prosperity of our country.

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No. 3.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ESSAY ON STALL FEEDING CATTLE. BY C. HILLYARD, ESQ., PRESIDENT OF THE NORTH-AMPTONSHIRE FARMING AND GRAZING SOCIETY.

From the London Farmers' Magazine.

A prize of twenty sovereigns having been offered by the English Agricultural Society for the best account of stall feeding cattle, to be sent in before the 1st of March, the essay was sent in before the appointed day. At the latter end of April there was sent to the writer for circulation a list of all the prizes offered, which list contained the following conditions:—

Competitors for the Essay on Stall feeding must state:

1. The number and sort of cattle placed in the stalls.
2. Their estimated value.
3. The period of the year when put up.
4. Whether the cattle were tied up or not.
5. The times when the food was given; whether always given at the same hour each day.
6. The quantity of food given.
7. The price paid for what was bought, if any, and the estimated quantity and value of what was produced on the farm.
8. The price for which the cattle were sold, and the time when.

3, 4, 5, 6, answered.

1, 2, 7, 8, might have been very easily answered.

Under the conviction that no one has had more experience, or bestowed more attention to stall feeding, the writer of this is induced to become a candidate for the prize offered by the English Agricultural Society, for the best account of stall feeding cattle.

It is the writer's opinion that on all arable turnip land farms, beasts should be stall fed, in numbers according to the size of the farms; and also to have store beasts in the farm yards to eat straw, and the refuse hay, which the stall-feeding beasts will not eat; to trample the dung thrown out of the stalls and thus have all the straw produced on the farms turned into good manure.

Many occupiers of entirely grass farms, stall feed for six weeks before Christmas, the greater part of their best beasts; in thus doing they look chiefly to the increased value of their beasts; the dung being of little value to them compared to what it is to the occupiers of arable land.

The writer of this has for many years put into the stalls, the latter end of October, five and thirty bullocks, and as they have been taken out fat, has replaced them by others. Three men and a boy are necessary to attend this number of beasts. The boy and two men to cut the turnips with the machine, to feed &c., the other man to assist in throwing out the dung in the morning, and the remainder of the day in cutting clover hay into chaff; so that the weekly expense of attending beasts in the stall cannot be estimated at less than one shilling each: this, and the value of the food consumed, makes stall feeding very expensive. It

is for the occupiers of arable land farms to consider whether being at such expense is likely to answer their purpose. Near large towns it cannot, for their straw can be exchanged for good dung. Buying manure and fetching it from a distance, the wear and tear is so great it cannot answer excepting where the produce of the farm is drawn to market. Those who with their arable have good grazing land, may turn their straw into good fair manure by giving their store beasts in the yard eating straw, three feeds daily of half a bushel of cut turnips; thus when they are turned out on good grazing land, they will become good meat the latter end of the summer or beginning of autumn, when good beef, from not being then plentiful, generally fetches a good price in Smithfield market.

In Norfolk it is a common practice to give store beasts in the fold-yard eating straw, as much linseed oil-cake as they will eat, this is getting good manure at an expense that cannot possibly answer but on very weak land at very low rents. It is a mistaken notion that beasts can be better fed in Norfolk than elsewhere. It is quite true that they are generally better fed, because it answers the purpose of Norfolk occupiers of land to keep them longer in the stalls.

Meat cannot be laid on lean beasts to pay the expenses of stall feeding, allowing the utmost value of the dung produced; they should be half fat when put in the stalls: and the price of beef higher when they come out than when they were put in, to repay the great expenses of stall-feeding.

Beasts when first put up may, for a short time, be kept on common turnips and hay, to keep their bodies from being heated by the great change of the atmosphere of the field to that of the house; but common turnips, from having so great a portion of water in them, will do very little towards feeding.

For stall feeding on a large scale there ought to be a mill on the premises to grind the corn into flour, thus getting rid of the miller's toll, the trouble, inconvenience, and expense of sending to and from the mill, the stall feeder thus having meal, the produce of his own grain. There are hand-mills made to grind corn into flour, but the grinding being by stones, they require so many men to work them, that one worked by a horse would answer much better. The hand steel mills which are sold to grind corn into flour, will only break it. A one horse chaff cutter would be the most useful where there is much stall feeding, and in fact on every large farm.

In Norfolk the greater part of the beasts are fed in yards with sheds. Polled Scots, and their polled home-breds may do as well as if tied up, but horned beasts certainly do not.

Stall feeding answers better in Norfolk than in most other counties, the land in general being so weak as to require more manure to raise good crops of turnips and corn, rents therefore are generally lower than elsewhere, which enables the occupiers to be at a greater expense for manure, and thus to keep their beasts longer in the stalls, and make them very fine meat for the London

market in the spring, when so great a portion of the wealthy people of the country are in town, and can afford to pay the highest price for the best beef, which at that season of the year is Norfolk sed Scotch, which will travel the long distance to London, with less injury to their carcasses than any other kinds of beasts. Stall feeding beasts should have plenty of straw under them, the straw saturated with their urine and droppings, thrown out, and their beds shook up after each time of feeding; they will then soon lie down, and this tends to their making great progress in coming fat.

If beasts have much hair on their necks and chins, it should be cut off on their being tied up, as it is apt to become so matted together as to make them feel itchy and uncomfortable. Curry-combing and brushing does them good.

An ox house ought to have a manger with two divisions for each beast, and a water trough for every two; and over the manger a rack for hay. There should be windows convenient for throwing out the dung and letting in plenty of air on the beasts first going in; and afterwards so to close, that be the weather warm or cold, the house may be always kept in one equal and tolerably warm temperature.

Beasts should be pushed on by degrees to fatten, not so highly fed at first as to cloy their appetite. The system of feeding pursued by the writer for many years has been this,—for the first ten days or fortnight of tying up; three feeds daily, of half a bushel each of cut turnips, and as much hay, night morning and the middle of the day, as they will eat. The next fortnight the same feeds of turnips, with three feeds of cut hay, with a little less than a gallon of bean or barley meal in the whole; with a small quantity of fresh made linseed oil, just to flavor it; hay put into the rack after the first feed of turnips, and as much at right as they are likely to consume before morning.

When on full feeding it is thus;—first feed in the morning, half a bushel of cut turnips, directly afterwards half a bushel of cut hay, with about a pint and a half of meal in it. These feeds repeated at noon and in the afternoon, and supped up at night, with hay in the rack, and three oil cakes, of three pounds each, in the manger. If oil-cake is high priced and linseed not, it may be substituted for it, by being mixed with the cut hay and meal. Boiling it is best, because that best dissolves it, and also prevents the numerous seeds of weeds in it from vegetating; but it will do pretty well if steeped in boiling water; and so it will in cold if broken in a hand-mill, and using seven tubs, so that when given to the beasts it will have been steeped seven days, and thus become a complete jelly. When boiled or steeped in hot water, it becomes sour in a few days, in which state it cannot be so good for beasts, although they might not reject it.

The different weekly cost of the food consumed by each beast will be as follows, including the expenses of getting up, carting and cutting the turnips and hay, and also the expense of attending the beasts, taking into consideration the extra value of the manure.

Feed No. 1.	s.	d.
10½ bushels of Swede turnips	2	9
1½ cwt. of hay	5	3
	8	0

Feed No. 2.	s.	d.
Turnips	2	9
Hay, 1½ cwt., cut and uncut	3	9
Meal, 6 gallons, mixed with the cut hay	3	0
Linseed oil, a pint	0	6
	10	0

Feed No. 3.	s.	d.
Turnips	2	9
Hay cut and uncut	3	3
Oil cake, 63 lbs., costing at home	6	0
£11 a ton	2	0
Meal, 4 gallons	14	0

Finding at Christmas 1838 that I could not get English oil cake to cost me at home less than four pence the three pound cake, about £12 10s. per ton, I determined to feed the five-and-thirty beasts then in my stalls in the following way; and I never had beasts that cost so low a price, become better meat; at the same time acknowledging that the process of preparing the food was very troublesome, and therefore should not recommend this mode of feeding, without the master looked to it himself, or had men he could depend on.

Feed No. 4.	s.	d.
Three feeds daily of half a bushel of cut hay, which is five pounds, and four pounds of uncut at night, 1 cwt. a week	3	0
Boiled linseed, 2 lbs. daily, seven shillings per bushel	2	0
Meal, barley, and bean mixed, 3½ gallons	1	9
Potatoes boiled, 1½ gallons daily	1	6
Molasses, which is of a feeding nature, but given ½ lb. daily, to make the mixture of cut hay, linseed, meal, and potatoes palatable	0	9
Turnips, ten bushels	2	5
	11	6

With a proper steaming apparatus, potatoes are a cheap and good food for stall-feeding.

Beasts may be fattened with little trouble and expense, with good feeding hay and raw potatoes; but not more than three pecks daily should be given, being of so heating a nature; if more is given, the beasts are likely to have all their hair come off, and to be greasy heeled.

Linseed oil cake is merely the husks of the seed after the oil is pressed out. Could my mixture of food in No. 4 feed be so pressed together as to form a cake, there cannot be a doubt but it would be as feeding. At the time the oil cake would have cost me eighteen pence per stone, this cost me, or I should say was of the value of one shilling.

Linseed without being mixed with other food would be of too relaxing a nature.

I tried sago, which, in the summer of 1838, was less than three half pence a pound, but it did not answer for stall feeding. It is well known to be good for weaned calves.

The comparative cost per stone of 14 lbs. for different kinds of food for stall feeding, is as follows:—

Linseed oil cake costing the consumer at home £10 per ton, 1s. 3d.; linseed at 56s. per qr., 1s. 11½ lb.; meal and barley, 30s. per qr., 1s.; bean

meal a stronger food, beans at 36s. per qr., 1s.; steamed or boiled potatoes on the average, about 4d. One stone of linseed in a mixture of feed will do as much towards fattening as two of cake.

The making out how the expenses of stall feeding are repaid, should be thus. The worth of each beast, on going into the stall should be entered into an account; at the bottom of which should be the value of all the different kinds of food consumed. Turnips, six or seven pounds an acre, about the value to be eat on the land by sheep; taking the turnips off may be said to be robbing the land of manure; but it is only borrowing from a part of the farm which is rich, to lay it on other parts where it is wanted. Hay at three pounds a ton is a full price being consumed on the farm.

To ascertain the profit of each beast must be in this manner. The average cost of the keep for each beast will be for the first month, 9s. per week—the month £1 16s.; the cost for the next month, £2 2s.—for the last fortnight, £1 8s.; whole amount, £5 6s. Ten weeks is the time calculated for feeding, because beasts ought to be in that forward state when put into the stall, as not to require more time to come out fat.

An estimate of the gain or loss in the feeding, may be made out in this way. Beasts of a moderate size, if half fat when put into the stalls, will increase in the first month about 8 stone of 8lbs., in the next month about 10 stone; in the last fortnight, 6 stone. The whole increase of weight in ten weeks' stall feeding, 24 stone, which at 4s. 4d. a stone, amounts to £5 9s. When interest of money and risk is considered, this shows a poor account. But if the value of beasts when put into the stalls was estimated at 3s. 8d. a stone, and the worth of them when they came out was 4s. 4d. this would give a profit of £3 6s. 8d. on each beast of 100 stone. Often has the writer found no advance in price, and some years a decrease.

Although it may at times be doubted, if stall feeding proves to be a benefit to those who are engaged in it, it will always be beneficial to the public, by increasing the quantity of animal food for market. Landlords should encourage stall feeding, for it is a likely means of having their arable farms enriched; besides which it gives employment to laborers on their estates, at that time of the year when it is in many parishes difficult for them to obtain it. They should permit tenants to plough grass land that does not produce a good herbage, on condition that they stall-feed, and thus make a great quantity of manure. A profitable crop of oats the first year, and a crop of wheat the next year, may be obtained, a summer fallow the year after, if not turnip land, and with a crop of barley the year following, the proper seeds may be sown with it to bring the land which produced a bad herbage, into a good pasture.

After all the great trouble and expense of stall feeding, this mortifying circumstance has frequently occurred. Smithfield being overstocked, beasts have been sold there at less than they were worth in any other market; the butchers knowing that the beasts after their driving, and being so knocked about in the market, were so injured it could not answer to turn them out to come in the next market-day, therefore bought them at their own prices. This often serious loss to stall feeders and graziers, may in future be prevented if all the different large droves of fat beasts destined for the London mar-

ket can be conveyed by rail-road at the same time, which appears doubtful. As the population of the country increases there must be an increased demand for beef; the increased supply must come from stall feeders, for there can be no increase of the acres of feeding land. Twenty years ago there were but few beasts but mine stall-fed in my neighborhood. Now there are many.

Stall feeding is generally supposed likely to answer best when the price of corn is low, but the old saying of "down corn, down horn" should be borne in mind. Such time may be the best to enrich the land, to produce large crops when corn fetches a better price.

In the feeding marked No. 2, good sweet grains may be mixed with the cut hay and meal. Turnips for beasts are best cut by the machines that do not cut them in thin slices, which takes more time in the cutting, and the beasts do not clear them up so well. The dirt is easily chopped off with the roots of the turnips as they are pulled up, so that washing is unnecessary.

A bushel of cut Swedes weighs 50lbs.; a bushel and a half is a fair daily allowance for a moderate sized beast, say from 100 to 122½ stones of 8lbs., which is 70 stones of 14 lbs., an acre producing 22½ tons will keep twelve beasts thus fed for eight weeks. Every beast in the stalls will make a large cart-load of manure in eight weeks.

To ascertain the progress beasts are making is by taking their girths once a fortnight. But until they have become marketably fat, the carcasses will not be the weight the measurement computes them to be. Beasts in the first fortnight increase but very little in their girth, because the first progress they make in feeding is in the side. When beasts are bought good fair meat, and driven 100 miles to get them home, their appearance and condition is sadly changed. They should lay in a well littered yard, a week or a fortnight, fed on turnips and hay, and, if it can be done, let out once a day into a field for water before they are put in the stalls. Beasts in the early stage of feeding are apt to be blown after eating their turnips. In most cases the swelling will subside if turned out of the stall and kept walking about some time. A table spoonful of carbonate of ammonia in a quart of water will relieve them, by correcting the acidity in the stomach, and expelling the wind.

No food can be given to stall-feeding beasts that will fatten them so soon as linseed oil-cake; but without it is at a low price there is no money expended on a farm that brings back so poor a return for the expenditure, but there is much less trouble in feeding with it than in any other way; beasts that have been fed with it do not, after a long drift to market, lose their firmness of handling, as those do fed without either cake or linseed.

The superiority of the manure produced from oil cake or linseed fed beasts ought to be considered. Those who have good feeding hay can fatten the largest sized beasts with it and oil-cake.

Durhams and Herefords are the most likely to pay the best for stall-feeding. When Durhams can be obtained that are well bred, I prefer them, for although they consume more food they increase so much more in weight as to produce the most profit.

There is the same trouble and expense in attending small beasts and sending them to market as with large. The writer recommends when buy-

ers come to bargain for stall feeding beasts that they are returned out of the stall, where they appear smaller than they really are.

He also recommends stall-feeders to get from Carey's, in the Strand, the sliding scale formed by the late Dr. Woolaston, from my book, given to Lord Althorp, to compute by measurement the weight of the carcass of fat cattle.

PENS FOR SWINE. MANURE.

From the American Swine Breeder.

The allotment of suitable enclosures, and the construction of convenient pens for swine, are matters of great importance to those who rear these animals with a view to profit. The miserable custom of permitting swine to roam at large, unattended by a swineherd, and allowing them to gather food throughout extensive districts, cannot be too severely reprehended. It is desirable that every farmer who consults the comfort of his animals should have both pens and pastures—the latter well covered with clover, of small dimensions, and, if possible, affording the hogs ready access to water. To effect this object, the fences which enclose the pasture may be extended so as to embrace a portion of some running stream, or if this is not practicable, some spring, from which water may be constantly flowing into an artificial reservoir. It is found that hogs thrive better, when they enjoy the means of slaking thirst as nature prompts them, than when they are restricted to water drawn from wells and furnished at stated intervals. Even in the absence of a stream suitable for the purpose, or a spring, water should, if possible, be conveyed to some artificial pool, or trough, in sufficient quantities for their use at any moment. The size of the pasture will of course depend, to some extent, on the situation of the farm, and number of hogs. In general, however, where the herd is numerous, it is deemed advisable, to scatter it in different enclosures, placing those hogs that are nearly of the same age and strength together. Small orchards, well set in clover, afford an excellent pasture for hogs. Their manure greatly enriches the ground; while the roots of the trees, near which, in such enclosures, their rooting propensities are mostly exercised, derive great advantage from frequently loosening of the soil.

It is a matter of great importance to the farmer to provide such enclosure, and adopt such treatment, as will secure from his hogs the greatest quantity of manure. Hog manure is extremely valuable, and large quantities may be obtained with slight attention. Where these animals are allowed the range of small yards or pastures, the method pursued by a correspondent of the Farmer's Cabinet, will prove advantageous*:—"I usually keep and fatten, he remarks, four hogs in the year; these I keep confined in a yard twenty feet square, with a warm and convenient shed attached thereto, as a shelter for them during the night time, and in cold and stormy weather." Into the yard he placed the scrapings of ditches, the dirt that is continually in and about buildings, and this became

mixed with the straw with which they were littered. The whole was cleared out as often as was judged expedient. The quantity and quality of the manure would be greatly increased, if the pen was supplied with weeds, (an excellent way this of turning these noxious plants to a good account,) and in the absence of weeds, which by the way is not very common, even on our best cultivated farms, resort may be had to the woods; here the farmer has an abundance of leaves and other rubbish that may be used to great advantage. "By the adoption of the above course, more than twenty-five loads of manure was obtained, as the product of four hogs, and this, too, of a superior quality to that generally derived from the stable or yard."

Another writer in the Yankee Farmer,* says:—"My plan is this; yard the hogs through the year. Give each hog, to work upon, ten loads of manure from the swamp. Some men think to avoid expense in keeping, by permitting their hogs to 'run at large,' or in a large pasture. This is a bad practice; the hogs 'run away' so much of their flesh, that it requires nearly as much to keep them in a thriving state as if they were yarded. If it did not, the pasture would be much more preferable for other stock. More than this, the hogs will convert about four loads more of mud into good manure, which will more than twice pay the extra cost of yarding."

Another correspondent still, of the same paper, remarks†:—"I keep my sty well littered with straw, leaves, weeds, soil from the woods, and meadow earth, obtained from ditching, by carting, together with that put into the yard, from two to ten loads per week. I sometimes put a few handfuls of rye in different places in the yard, and let in the hogs. Feeding them there for a few days, they completely stir up and commute the contents of the yard. I am confident that I make four times the quantity of manure my father did, and with no increase in the number of stock, and of a little better quality, too, comparatively none of its strength being washed away by the rains and evaporated by the sun."

The suggestions of a correspondent to the Northern Farmer, quoted in the Farmers' Register, contain much information on this subject. After stating the reasons which induced him to abandon the ordinary mode of suffering his pigs to run at large, for the better one of confining them in pastures—and his subsequent exchange of this for a smaller enclosure, which he contracted from time to time, until satisfied that a yard of twenty feet by fourteen, was sufficient for six hogs, if well supplied with materials to make manure in to advantage, he thus continues:—"My method of supplying these materials is the following; after having cleared their yard at the season of planting, I put into it such portions of straw as I may have on hand after the season of foddering is past; and if I have not a sufficient quantity of this to furnish the necessary supply till vegetable substances attain a sufficient growth to be profitably collected, I put in earth collected from the low places by the side of the highway; though this I more generally place in or near my barn yard, in a situation to receive and retain the wash

* Vol. ii. p. 48.

* Vol. iii. p. 410.

† Vol. i. p. 67.

that might otherwise escape from that. Brakes and weeds of any kind are valuable. These I make use of, to the extent they are attainable, when in a green state, as I consider green vegetable substances, for this purpose, far more valuable than dry. Potato tops, when pulled for early use, before they become dry and shriveled, I consider equal if not superior to any other green substance for this purpose. Pea vines I usually put into my hog yard after the peas are thrashed off, and if some are put in before being thrashed, they are as gratefully received by the inmates of the yard. The quantity of manure made by my hogs is, for each one, double that made by each cow for the same period of time. The quantity of vegetable matter suitable for manure, that remains in most crops after the fruit and grain are selected, and the amount of manure that can be obtained if this matter is carefully collected and carted to the pens of hogs and other animals are indeed astonishing. "The expressed cane," says J. H. Cowper, in an able communication to the Southern Agriculturist, "tops and leaves, from an acre of cane yield about 10,000 lbs. of dry vegetable matter. An acre of corn including blades, stalks, husks, and cobs, gives about 3500 lbs., when the yield of corn has been 20 bushels; and the after crop of peas 1000 lbs.—together 4500 lbs. An acre of solid peas 2000 lbs. The potato vines, pumpkins, and turnips, being eaten green, contribute only to the production of fluid manure. The total quantity of vegetable matter to be applied to the manuring of 16 acres in crop, will therefore be—

4 acres in corn, at 4500 lbs. per acre, -	18,000 lbs.
1 acre in peas and turnips, -	2,000 "
3 acres in cane, -	30,000 "
	50,000

which, if merely rotted by the rain, will yield 100,000 lbs. of manure, and if rotted by urine and dung of stock from 150,000 to 200,000 lbs. or at least 25,000 lbs. of manure to each of the four acres proposed to be manured."

We are inclined to dwell still longer on the subject of manure, because its great importance, and the proper modes of collecting the greatest quantity, seem in many portions of our country to be wholly overlooked. Especially is this the case throughout the western states. Trusting to the extreme luxuriance of the soil, the lands of many farmers are burdened with one exhausting crop after another, until at length the productiveness of the farm is materially reduced, and finally measures are necessarily resorted to, to improve an impoverished condition of the soil which proper manuring would have prevented altogether. Many persons seem to consider a yard where the dung of animals can be collected, sufficient for all purposes—little dreaming that upon the construction of this enclosure depends both the quality and quantity of the manure; that successive rains may be gradually washing away the most fertilizing portions of their yard, or excessive fermentation causing the escape of gases which, if possible, should always be retained. The dung of animals, when intended for manure, should be protected as far as practicable from exposure to the air. "He," says Arthur Young, Esq., "who is within the sphere of the scent of his dunghill, smells that

which his crop would have eaten, had he permitted it. Instead of manuring the land, he manures the atmosphere, and before his dunghill is finished, another parish and perhaps another county." "As few exhalations," remarks Fessenden,* "as possible, ought to be suffered to rise from the excrements of animals. Fresh manure ought to be kept as carefully from the sun and rain, as grass which has been cut for hay." But how are these objects to be effected? The answer is an easy one. Prevent the rain from draining off the best portions of the manure, by constructing a yard in a dishy form, lowest in the centre, so that the urine of the animals may be collected in a reservoir and retained; and prevent fermentation, or absorb its products by occasionally scattering over the dunghill a quantity of the same earth with which the yard is bedded. "Earth," remarks the author of the letters of Agricola, "is a powerful absorber of all the gases which arise from putrefaction." Put a layer of common soil along the top of a fermenting dunghill, from twelve to eighteen inches thick, and allow it to remain there while the process is carrying on with activity, and afterwards separate it carefully from the heap, and it will have been impregnated with the most fertilizing virtues. The composts which of late have attracted such universal attention, and occupied so large a place in all agricultural publications, originated in the discovery of the absorbing power of the earth, and in the application of it to the most beneficial purposes. A skillful agriculturist would no more think of allowing a violent fermentation to be going on in his dunghill, unmixed with earth, or other matter, to fix and secure the gaseous elements, than the distiller would suffer his apparatus to be set at work, without surmounting his still with the worm, to cool and condense the rarefied spirit which ascends to evaporation. In both, the most precious matter is that which assumes the aeriform state; and to behold it escaping with unconcerned indifference is a demonstration of the most profound ignorance.

A slight fermentation in a dunghill, may indeed be advantageous in causing the woody fibre, contained in many of the substances deposited there, to decay and dissolve, but wooden fibre is the only vegetable matter that requires this process to render it nutritive to plants. In the straw of chaff and litter, as well as the leaves and other products of the forest—which may be advantageously placed in barn yards for conversion to manure—will be found considerable portions of fibrous matter, which must be fermented to be useful. It therefore becomes a matter of great importance to ascertain correctly how far this process of fermentation should be allowed to proceed. On this point Sir Humphry Davy remarks†:—"In all cases where dung is fermenting, there are simple tests by which the rapidity of the process, and consequently the injury done may be discovered. If a thermometer, plunged into the dung, does not rise to above 100 degrees Fahrenheit, there is little danger of much aeriform matter flying off."

"When a piece of paper, moistened in muriatic acid held over the steam arising from the dung—

* Vide Complete Farmer, p. 173.

† Vide Davy's Agricultural Chemistry, republished in the Farmers' Register.

hill, gives dense fumes, it is a certain test that the decomposition is going too far, for this indicates that volatile alkali is disengaged.

"When dung is to be preserved for any time, the situation in which it is kept is of importance. It should, if possible, be defended from the sun. To preserve it under sheds would be of great use; or to make the site of a dunghill on the north side of a wall. The floor on which the dung is heaped should, if possible, be paved with flat stones, and there should be a little inclination from each side towards the centre, in which there should be drains, connected with a small well furnished with a pump, by which any fluid matter may be collected for the use of the land. It too often happens that a dense mucilaginous and extractive fluid is suffered to drain away from the dunghill so as to be entirely lost to the farmer."

The urine of animals is one of the most valuable manures that can be applied to land; but it should be applied in a recent state, as a great portion of the soluble animal matter it contains is destroyed during the process of putrefaction. If unmixed with solid matter, it should always be diluted with water, as in its pure state it contains more animal matter than can be safely absorbed for the nourishment of plants.

According to some writers and practical farmers,* the value of the urine of cattle, if properly preserved and applied to the purposes of vegetation, is greater than that of all the dung which the same animals would yield. A letter from Charles Alexander, near Peebles, in Scotland, addressed to Sir John Sinclair, in 1812, contains much valuable information on this subject. "This intelligent farmer had long been impressed with the great importance of the urine of cattle as a manure, and he set about to discover, by a long and well-conducted series of experiments, the best method of collecting and applying it. He began by digging a pit contiguous to the feeding stable, but distinct altogether from that which was appropriated for the reception of the dung. The dimensions of this pit were thirty-six feet square, and four feet deep, surrounded on all sides by a wall, and the solid contents were one hundred and ninety-two yards. Having selected the nearest spot where he could find loamy earth—and this he always took from the surface of some field under cultivation—he proceeded to fill it, and found that, with three men and ten horses, he could easily accomplish twenty-eight cubic yards a day; and the whole expense of transporting the earth did not exceed twenty-two dollars. When the work was complete, he leveled the surface of the heap in a line with the sewer which conducted the urine from the interior of the building, on purpose that it might be distributed with regularity, and might saturate the whole from top to bottom. The quantity conveyed to it, he estimated at about eight hundred gallons. The urine was supplied by fourteen cattle, kept there for five months on fodder and turnips. The contents of the pit produced two hundred and eighty-eight loads, allowing two cubic yards to be taken out in three carts; and he spread forty of these on each acre, so that this urine in five months produced a compost sufficient for the fertilization of seven acres of land. He states farther, that he had tried this experi-

ment for ten years, and had used indiscriminately in the same field either the rotted cow-dung or the saturated earth; and in all stages of the crop he had never been able to find any preceptible difference. But what is still more wonderful, he found his compost lasted in its effects as many years as his best manures; and he therefore boldly avers that a load of each is of equivalent value. Mr. Robert Smith, of Baltimore, has his stables constructed in such a manner that all the liquid discharges of his cattle are conducted, together with the wash of the barn-yard, into a cistern, pumped into a hogshead, and applied in a liquid state to the soil which it is wished to manure. This mode of making use of this substance, is likewise recommended in the Code of Agriculture:—"The advantages of irrigating grass lands with cow urine almost exceed belief. Mr. Harley, of Glasgow, (who keeps a large dairy in that town,) by using cow urine, cuts some small fields of grass six times, and the average of each cutting is fifteen inches in length. There are disadvantages, however, connected with this mode of applying this powerful manure. It must be applied soon after it is formed, or oftentimes the putrefactive process will commence and deprive it of part of its efficacy. And, as urine is of a scorching quality, it is unsafe to apply it to growing crops in great heat or drought. Hence it is unadvisable to use it except for grass, after the months of April and May, unless diluted. It is particularly useful in the spring, when the application of liquid manure gives a new impetus to the plant and makes its growth more vigorous. This manure forces newly planted cabbages in a most remarkable manner."

BEET SUGAR IN EUROPE.

As a source of wealth, profit, and general benefit to the agricultural interests of the country the cultivation of the sugar-beet, either for the purpose of making sugar, or feeding stock, is most unquestionably entitled to the attention of every agriculturist and philanthropist in the country.

When in the sugar districts of France, a few years since, the writer became so much interested in this subject, that he has ever since watched its progress, not only in that country, but throughout Europe, with increasing interest, and with the hope of seeing it, long ere this, introduced into this country. At the time of his visit to France, four or five per cent. was the maximum yield of sugar from the beet, and with this yield, it was considered an excellent business. Since that time, so much improvement has been made in its manufacture, that 7 or 8 per cent. is now readily obtained, and in some cases as high as nine. The writer has lately been shown a letter from M. Crespel of Arras, one of the largest manufacturers in France, which states that at one of his establishments, (and he is interested in eight or nine,) he will make 1000 hogsheads of sugar the present season, and this at a cost of less than 5 cents per pound.

David Lee Child, Esq. who has spent eighteen months among the sugar manufactories in France, Belgium and Germany, in a work on this subject which he has recently published in Boston, estimates the quantity of beet-sugar manufactured in

* Vile Complete Farmer, p. 175—177.

Europe in 1838, at 150,000,000 of lbs.; and it is confidently expected that the crop of 1839 will reach 200,000,000 of lbs., or two hundred thousand hhds. which is nearly four times the average crop of Louisiana. Indeed, the manufacture of sugar from the beet has not for a long time been considered a matter of speculation or experiment in Europe, but a subject of very sure and profitable investment of capital. The manufacture of sugar from the beet however, is but a *small portion* of the advantage arising from its culture. As winter food for stock, particularly milch cows, it is unquestionably the *most profitable* crop the farmer can raise; and its meliorating effects upon the soil, and the increased quantity of manure, wherever the beet has been cultivated in Europe, have, it is well known, more than doubled the produce of the soil, and in many cases, more than trebled the price of the lands.—*Jour. Com.*

TREATMENT AND FOOD OF YOUNG PIGS.

From the American Swine Breeder.

In the second chapter of this work, we have already alluded to this subject,—and it is certainly one deserving the most careful consideration,—care and attention to these animals at this tender age is of far greater importance than the practice of many would lead us to suppose and upon their treatment during the few first weeks depends the ease and rapidity with which they can be subsequently reared and fattened. To wean young pigs in such a manner, that they may lose no flesh during the process, and may remain at its close in a healthy and growing condition is an undertaking attended with considerable difficulty. Their food should in general be given *moderately warm*, and milk is undoubtedly one of the best articles which can be offered at this period. The produce of the dairy should, therefore, be used frequently and freely. Many judicious farmers have asserted, as the result of experience on this subject, that cows may be kept, for the exclusive nourishment of *young pigs*, with great economy. That this will be the case, when the proceeds of the dairy are given, no one who has tried it will dispute. Several instances are recorded of hogs that have been *fattened entirely* on this article for the purpose of experiment; and the result has shown, that no pork is superior in point of weight and substance. Of the astonishing rapidity with which animals will thrive and increase while using it, we have ourselves seen abundant proof, in the growth of an improved Berkshire boar, which was weaned under the direction of a highly intelligent agriculturist, Solomon Porter, Esq., of Connecticut, and afterwards fed almost entirely on this article, and which attained, at the age of three months, the great weight of one *hundred and forty pounds*.

The practice of mixing milk with other articles for food of young pigs, is highly recommended by many farmers. Says a judicious breeder, in a letter to the Hon. H. L. Ellsworth, "From actual experience, I have come to the conclusion, and practised upon it for the last twelve or fourteen years, of having as many spring pigs (that come say in March) as I have cows for the summer, and feeding the pigs on milk or whey, mixed with provender, ground from corn, rye, oats, barley, or buckwheat, and prepared in the form of a pudding,

in which way the pigs will eat it best. If they appear to be clogged with one kind of grain, I try another, and often mix different kinds together."

The author of the 'Practical Elements of Agriculture,' suggests that pigs should be weaned at the end of the first six or eight weeks; and be fed three times daily with wheat bran, barley dust, or by farinaceous food mixed with water warmed to the temperature of the mother milk, and with whey, or other refuse of the dairy or kitchen. Young pigs, he remarks, are sometimes disposed of when sucking the dam. In other cases, they are sold when weaned, to persons who design to feed them, and in other cases they are fed by the breeder himself.

"When they are fattened by the breeder, two modes of feeding may be adopted. They may either be suffered to go at large, or they may be kept in pens and houses; by the first of these methods after being weaned and fed for a period until they are able to shift for themselves, they are turned abroad to pick up what they can in the straw yard, a little green food, as tares or clover during summer, and turnips or potatoes during the winter being supplied to them. They do not, under this management, receive any more expensive feeding until they are put up finally to be fattened, when they are confined for a few weeks and fed on farinaceous and other food. The pigs intended for this species of management should be the best of the *smaller varieties*, and they may be killed for domestic use or disposed of when seven or eight stones weight. All the accommodation required under this system of management, is a few pens with sheds: first, for the breeding swine when nursing their young, and second, for the pigs which are in the course of being fattened.

In all cases upon a farm, a certain number of pigs may be kept at large in this manner, for picking up the waste of the farm yards. But the regular course of management and that best adapted, where the feeding of the animals is carried on upon a large scale is where separate feeding-houses for the pigs in which a greater or lesser number can be kept.*

"Weanlings," remarks Mowbray, "should have at least one month of delicate feeding, warm lodging, and care. The same kind of food should be continued to them three times a day, to which they were at first accustomed with the sow. The first food should consist of warm and nourishing wash, whether from the kitchen or dairy, thickened with fine pollard or barley meal. A portion of strong beer may be added as a cordial, should circumstances render it necessary. The common wash, pollard or meal mixed with water, if scalded the better. The same diet is proper for the pigs to partake of whilst sucking. Very young pigs ought not to be left abroad in continual rains, and will always pay for a daily moderate feed of old beans with clover."

"Weanlings are fattened for delicate pork chiefly in the dairies, where they are made ripe in a few weeks. Generally a pig of five or six months old will be fattened in seven, or eight, or twelve weeks, dependent on his condition."

An English writer remarks, "Swine will fatten much faster on warm than cold food. Corn and cold water will make them healthy, but warm be-

* Vide Elements of Practical Agriculture, p. 601.

verage is considered as requisite to quick growth. Some English farmers turn in their little pigs to the fattening sty. While the fattening hogs are taking their repast the little ones wait behind them, and as soon as their betters are served, lick out the trough."

"Besides the advantage of having by this method no waste or foul troughs, there is another: the large pigs rise alerly to their work lest the small ones should forestall them, and fill themselves the fuller, knowing they have it not again to go to."

"The disadvantage of this practice is that the large ones are apt to lord it too much over the little ones, especially in a confined sty. If, however, they have a separate apartment assigned them, with an entrance too small for the fattening swine to follow them, this disadvantage would be in a great measure remedied."

A writer in *Rees's Encyclopedia*, while writing in regard to *young pigs* and *sows with pig*, holds the following language: "The sows considerably advanced in pig, and those with pig, should be fed in a better manner than the store pigs. The former should be supplied with good wash twice or oftener in the day, and have a sufficient allowance of cabbages, potatoes, carrots, or other similar vegetables, so as to keep them in good condition, which is shown by the gloss of their coats. The sows with pig, should be kept with the litter in separate sties, and be still better fed than those in pig. When dairying is practised, the wash of that kind which has been preserved for the purpose while the dairying was at its height, in brick cisterns constructed for receiving from the dairy—must be given them, with food of the root kind, such as carrots, parsnips, potatoes, and cabbages, in as large proportions as they will consume them, in order that the pigs may be properly supported and kept in condition."

But when the business of dairying is not carried on, so as to provide wash of that sort, meal of some kind or other must, Mr. Arthur Young thinks, be had recourse to for the making of wash, by mixing it with water which, in the summer season, will be sufficient for their support, and in winter it must be blended with the different sorts of roots prepared by boiling; or when for young pigs with oats and pea-soup. With this soup and dairy-wash, when proper attention is bestowed, young pigs may, he conceives, be weaned and reared in the winter season even, with profit and success. The pea soup is an admirable article when given in this intention. It is prepared by boiling six pecks of peas in about sixty gallons of water, till they are well broken down and diffused in the fluid; it is then put into a tub or cistern for use.

When dry food is given in combination with this, or of itself, he advises oats, as being much better than any sort of grain for young pigs, barley not answering nearly so well in this application. Oats coarsely ground have been found very useful for young hogs, both in the form of wash with water, and when made of a somewhat thicker consistence. But in cases where the sows and pigs can be supported with dairy wash and roots, as above, there will be a considerable saving made by avoiding the use of the expensive articles of barley meal, peas or bran, and pollard.

Mr. Donaldson remarks that in the usual mode the pigs reared by the farmer are fed for some

weeks, after they are weaned, on whey or butter milk or on bran or barley meal mixed with water. They are afterwards maintained on other food as potatoes, carrots, the refuse of the garden, kitchen scullery, &c., together with such additions as they can pick up in the farm yard. Sometimes they are sent into the fields at the close of harvest, where they make a comfortable living for several weeks on the gleanings of the crops; or at other times where the farms are situated in the neighborhood of woods or forests they are sent thither to pick up the beech mast or acorns in the fall of the year. And that when they are arrived at a proper age for fattening, they are either put into this fitted up for the purpose, or sold to distillers, starchmakers, dairymen, or cottagers. As to the treatment and feeding of *porkers* or *growing stores*, considerable diversity of sentiment prevails; some contending that they should be constantly confined in suitable pens or small enclosures, while others recommend their ranging more at large—where the object desired is merely to keep these animals in a thriving condition till the season of fattening arrives; the latter method may be pursued perhaps with some advantages. Still in these cases, the range allowed should not be too extensive, and generally confined to yards in the immediate vicinity of the barn, or at the proper season to pastures well set in clover.

A STATEMENT OF THE CULTURE AND PRODUCT OF SUGAR BEET, MANGEL WURTZEL, FIELD CARROT AND SUGAR PARSNIP ON THE FARM OF JAMES GOWEN, MOUNT AIRY, IN THE SEASON OF 1839.

Submitted and read by James Gowen, before the "Philadelphia Society for promoting Agriculture," at their stated meeting, Wednesday, Feb 5th.

The land set apart for these roots was part of an old apple orchard, and is a light sandy soil, intermixed with mica, or isinglass, and from which a crop of corn had been taken the previous year. It was ploughed as early in the spring as possible, say 19th March, and before ploughing was limed at the rate of thirty bushels to the acre. It was permitted to rest a few weeks, after which it had a tolerable dressing of well rotted stable manure immediately ploughed in. Before harrowing, it was treated with a few cart loads, say about 150 bushels, good street dirt, applied lime fashion from the cart, by scattering with the shovel—then harrowed. The quantity of manure in all was not more than would have been used on similar soil in same condition for potatoes. The labor up to sowing was two ploughings, two harrowings and one rolling, the last operation deemed indispensable in such soil, and to render the drilling more perfect.

Half an acre was intended for mangel wurtzel—half an acre for sugar beet—half an acre for field carrots, and a quarter of an acre for sugar parsnip; but the seed for mangel wurtzel falling short, and there being an abundance of beet seed on hand, the latter was increased to more than half an acre, while the former stood less by as much as the other was increased.

The drill used when working for beet and mangel wurtzel was provided with three teeth, set two feet six inches apart, cutting three drills of two

and a half feet apart at one operation. For carrot and parsnip four teeth were furnished, set two feet apart, cutting four drills, two feet asunder, at one operation. Seed sown continuously in the drill by hand, in quantity for all about three times as much as plants would be required. All was sown betwixt the 16th and 18th of April. When well up and properly developed, the beet and mangel wurtzel were thinned to six or seven inches apart, the carrots to three or four, and the parsnips to four or five inches apart.

The hoeing was performed by a cultivator set with duck feet or scalpers; it might be dragged by a stout man, but in the present case a light short-tread horse was used, led by a careful man while a thorough hand held or conducted the scalper. The holder, or ploughman, should be of quick eye and steady hand, to be prepared for the slightest deviation of the horse which might bring the outline scalpers next the drill, to which the inclination tended, upon the plants, which would prove as fatal to them as to the weeds—the scalpers making clean work of all that come in their way. By this method of hoeing, and of keeping the ground clean and loose, much labor and time were saved, for in two hours as much might be done in this way, as would take a good hand to perform in a week, and then it would be better done by the scalper, than by hand hoeing. An hour or two by the scalper at proper and convenient periods, with now and then a ready hand weeding when coarse weeds were observable among the plants were all the time and labor bestowed at this important stage of culture. Taking the whole labor from the beginning to the gathering of the roots included, it would not be greater than that which is usually bestowed on a well worked patch of corn; nor can the manure used, be estimated, as to quantity and value, to be greater than would be required for potatoes cultivated in the common and usual way on a patch of ground in similar condition.

Product.

Sugar beet, less than three-fourths of an acre, having* in the patch ten large old apple trees, produced 640 bushels clean and close topped roots; a bushel (as ordinarily filled in manner as the 640) weighed 64 lbs.	Tons.	cwt.	qrs.	lbs.
	18	5	3	24
Mangel wurtzel, less than three-eighths of an acre, having six apple trees in the patch, 320 bushels.	9	2	3	12
Field carrot, half an acre, having nine apple trees in the patch, 360 bushels.	7	8	2	8
Sugar parsnip, one-fourth of an acre, having seven apple trees in the patch, 120 bushels	3	8	2	8
Total	38	4	2	24

In less than two acres.—Would not be over one and three-fourths of an acre, deducting space of trees. If allowance be made for trees and their shade, the above result must prove very encouraging to those who intend to turn their attention to the culture of green crops.

DEPTH OF PLOUGHING.

From the Library of Useful Knowledge.

The proper depth of ploughing must necessarily depend upon the nature of the soils; but although every intelligent husbandman must be aware of the superiority of those of a deep staple over those which are shallow, yet, in discussing the propriety of the extent to which the operation may be safely

carried, it should be borne in mind that there is a wide difference between the effects of ploughing deeply into land, the vegetative stratum of which is of nearly equal fertility throughout, and that of augmenting a shallow surface of fertile soil by mixing it up with a subsoil of inferior quality.

The depth to which the roots of plants penetrate into the earth in search of sustenance, varies as much, according to the properties of the soil, as does the nature of the plants themselves. There are many, the roots of which are found at fifteen to twenty, and even thirty feet under ground—sainfoin and lucerne, for instance; even red clover will strike down to nearly three feet, if the soil be a fertile loam; and some of our commonest vegetables, if it be friable or sandy, push their tap-roots to about the same depth. But as the land is chiefly destined for the production of grain, its value is rather to be considered according to its capability for the growth of corn than for that of any particular species of green crop.

It may be observed by the mere naked eye, that if the land be of a free nature, the roots of wheat will penetrate as far as eight inches into the earth; and when sown on the crowns of ridges, they have been found in rich soils at the depth of twelve; though that probably arose from the greater influence of the atmosphere, for they do not reach to the same depth on level ground. The seed is usually sown at about two inches deep; consequently, the roots may be ten inches long. We may, therefore, assume the depth of twelve inches as the utmost vegetative limit of corn land.

If the plants lie close together, they are disposed to penetrate more deeply into the earth than when they are wide apart; for it may be remarked that the roots of corn avoid each other, and push their strongest shoots into those spots where they have most room to spread; but if the seed be thickly sown, they are then forced to strike their roots perpendicularly, instead of laterally, into the ground. Still, however, this must depend upon the nature of the land; for if the subsoil be sterile or tenacious, the roots then either meeting opposition, or not finding nourishment, must again seek the upper stratum. There, they become matted together, and, each contending for the share of nutriment of which it has been deprived, the weakest are often seen to perish; which in a great measure accounts for that partial failure which frequently attends corn crops at the very height of the season. Provided the soil be open and tolerably fertile, the nearer its depth approaches to that which we have stated to be its vegetative limit, the great number of plants may it therefore be supposed capable of furnishing with support;* and, if attentively observed, a material difference will be found between

* A remarkable instance of this is mentioned in the Bedford Report, in which it is stated "that a road having been made across the ends of some ridged lands in the parish of Ridgemount, the cultivated soil of the ridges was cast into the hollows. The field was afterwards sown with barley, and the scattered corns which grew where the soil was accumulated in the ancient furrows formed a remarkable contrast with the rest of the field. The produce of the barley crop was little more than three quarters per-acre, while that which grew on the same poor soil, accumulated, perhaps, a foot deep, was remarkably luxuriant, many of the corns producing from ten to twenty stalks, and the ears large in proportion." An effect which the reporter ascribes to no other cause than the depth of the soil.—p. 277.

the nutritive properties of land of a deep staple, and that which is more shallow, although the quality of both, when tried in equal quantities, may be the same.* When deep, it also possesses the great advantage of suffering less either by extreme heat or by wet, than when thin; and the corn being supported by a greater depth of root, which probably affords proportionate strength to the lower part of the stem, maintains its freshness with greater vigor in times of drought, and is less subject to be laid by storms of wind or rain. It is almost unnecessary to add, that depth of soil is equally advantageous to every crop, the roots of which go deeper into the soil than those of corn, though its progressive increase in value is not so great as that which lies nearer to the surface.

In order to maintain the properties of a deep soil in a perfect state, it is, however, expedient to plough it from time to time to the full depth of the vegetative stratum; so that, being completely worked by frequent turnings, it may be freely exposed to the influence of the atmosphere. If that be not done, or only superficially performed, the ground will, by slow degrees, become gradually impoverished; for, besides being deprived of the benefit of exposure to the air, a crust of hard and almost impenetrable matter will, in some soils, be formed immediately below that portion upon which the plough was usually made to act, thus constituting a barrier between the upper surface and the subsoil, which is well known to farmers under the appellation of the *moor-band*, or *pan*. It is not, however, necessary to repeat the operation, even on heavy land, more than, perhaps, once in six or seven years, especially if the intermediate ploughings under the common course of cultivation be made at various depths; for nothing tends more to the formation of the pan than the constant repetition of the process at the same depth. Thus it will not escape observation, that one great advantage of the alternate system of husbandry arises from the distinct nature of the different roots which are cultivated, and the consequent necessity of ploughing at various depths, so as to afford them room to seek for sustenance. On tenacious clays, which, being confined to the growth of grain, are usually ploughed to the same depth, it also forms a strong reason for the adoption of the summer fallow.

The maintenance of the properties of the soil in its original state is, however, a very different mode of procedure from that required by an endea-

vor to restore it to perfection; for there is much land of a deep and naturally mellow staple, the lower strata of which have been rendered sterile by shallow ploughing, and can only be progressively renovated by gradual degrees; or, according to the practice of those farmers who "like to go deep enough to chip up the dead soil, now and then, and show it a little upon the surface after all is finished."* Many instances have, indeed, been recorded in which the subsoil, when brought to the surface and exposed for some time, has proved extremely fertile; but in all those cases, the earth, when chemically analyzed, has been found to contain a considerable portion of carbon, and unless afterwards sustained by proportionate quantities of manure, its good qualities have been speedily exhausted. It cannot, therefore, be deemed generally expedient to bring up a greater quantity than at the most two inches of the virgin earth, even supposing it to be naturally of the best average quality. The operation should be performed before the winter, and the soil should be incorporated by the means of a summer fallow; observing however, that its main object being to expose this fresh substance to the atmosphere, it should be left as long as possible on the surface. The manure should be also applied at the same time, and, instead of being mixed up with the soil, should be spread uniformly over this layer of new earth, which thus imbibes its juices during the whole of the wet season, and, notwithstanding all the objections which have been urged against the evaporation of dung,† never fails to produce a striking effect on its amelioration. In this manner, Mr. Thaër assures us that he has successively, during a series of years, effected the gradual and complete mixture of different layers of soil in one season; that he has thereby not only augmented the vegetative stratum of his soil, but has experienced a very sensible improvement in his crops; and that, after the close of a rotation, he has repeated the experiment with equal success. To which we may add, that many farmers who have followed the same plan, have uniformly found it attended with similar results; though others, who have not taken the precaution of going leisurely to work, or who have not been sufficiently aware of the nature of the subsoil, have, in some instances, done considerable injury to their land.‡

There are, no doubt, many deep soils naturally of an equal quality throughout, but which, consisting of tenacious clay, or *till*,|| of various kinds, would, if brought up to the surface, impoverish the

* Von Thaër calculates this difference in proportionate degrees in land which contains a vegetative stratum of soil of four, six, eight, and twelve inches in depth; provided, of course, that it be all of equal quality. If, therefore, each seed were to produce a plant, it would follow that ground which contains eight inches depth of fertile mould, might be sown with double the quantity of that which consists of only four inches. He, however, admits that this principle cannot be carried to that extent, because the action of the atmosphere must ever afford such a superiority to the surface, that a cubic foot of mould, if divided into two square feet, will always produce a greater number of plants than if the seed were sown upon one foot superficial; but he assumes the value of the land to be increased in the proportion of 8 per cent. for every inch of mould beyond the depth of six to ten inches, and to be diminished in the same proportion, from six to three inches in soils of a thinner staple.—*Principes Raisonnés d'Agriculture*, vol. iii., p. 138. s. 785.

* Survey of Essex, vol. i., p. 198.

† On the subject of evaporation, see vol. i., chap. x., pp. 239 and 248. If the land lies upon such a slope as may cause the dung to be swept off by the rains, then it should, however, be buried by a very slight ploughing.

‡ See the Reports of Essex, vol. i., p. 197; Bedford p. 276; Bucks, p. 128; Stevenson's Surrey, pp. 148 and 176; Malcolm's Surrey, vol. i., p. 268; Kent's Norfolk, p. 37; Gen. Rep. of Scotland, vol. i., pp. 347 and 419; and Loch's Improvements on the estates of the Marquis of Stafford.

|| In Scotland, "*till*" is understood to imply, as a subsoil, a mixture of clay with sand and gravel, devoid of vegetable matter, and impervious to water. In Ireland, this description of soil is called "*Lackleagh*," and the pan which it forms is there broken up with a plough of immense weight and strength, called a "*miner*," which

ground, and bring in their train a long list of noxious weeds, were they not corrected by the process of perhaps more than one summer fallow, together with an application of both lime and dung; and it is also true, that even if these substances can be readily obtained, yet the expense, even if repaid by the land, may not suit the farmer's pocket. Under ordinary circumstances, indeed, large operations of that nature, which are intended to effect a permanent improvement in the soil, cannot be considered a coming within the scope of common farming and can only be undertaken by the owner of the land, or on terms which will secure the tenant in the return of his outlay; for it should be clearly understood that in no case can it be effected without either the assistance of extraneous manure, or by the sacrifice of a portion of that which properly belongs to the usual cultivation of the farm, and might, therefore, probably be more advantageously applied to the support of the soil already under tillage.

Neither should *poor soils* be ploughed deep; for the vegetative mould with which the surface of land of that description is covered, having been formed by the decomposition of the scanty herbage which grew upon it when in a state of nature, is proportionably thin, and the subsoil on which it reposes consisting generally of sterile materials, it will be found bad policy to mix them with the upper stratum, which, though perhaps not very productive, yet requires the whole power of the small portion of manure which it furnishes to preserve it in tolerable condition.* This, more especially, if it be intended to return the land to grass; for the sward seldom penetrates farther than about two inches into the ground, and its value, therefore, depends chiefly upon the fecundity of the surface upon which it rests. Thus the generality of those farmers who are situated upon wolds and downs, carefully avoid ploughing below the top-soil; for when there is a vein of rubby chalk, or of small broken flints, immediately under the topsoil, they look upon it as "the dross of the land," and that, if ploughed up, it is quite poison to the field.†

If the land be of a *sandy nature* the ploughing of which has been always carried to one depth, and that a pan has thus been formed underneath, in that case, also, it is judicious to break it up; for, independently of the labor of the operation, the surface may have been much ameliorated by good culture, and the hard crust which lies at the bottom both secures the manure from being carried down below that part which is actually tilled, and also prevents the escape of humidity from the upper stratum. Another layer of sand, indeed, not unfrequently exists under the pan; for that

acts without a mould-board, and is followed in the furrow by another plough of the common power. See vol. I., chap. xxix., p. 465.

* "The Norfolk farmers, generally possessing a thin light soil, with a poor and barren subsoil, prefer shallow ploughing at all times, and argue that it is easier to keep a small quantity of soil in good heart than a greater quantity, which would be formed by deep ploughing."—*Dumfries Rep., App.* p. 578.

† "Many instances are shown where land of this kind, ploughed too deep upwards of twenty years ago, has not yet recovered its former goodness; and, to keep the top-soil as deep as possible, the best farmers will not permit the surface flints to be picked off for the roads, lest it should make the land both lighter and thinner."—*Davis's Survey of Wiltshire*, p. 52.

species of crust is often found where land has been much marled; but although it might be desirable to have it at a greater depth, yet its removal is a work of extreme difficulty, and, on such soils, will rarely repay the expense. On sand veins where there is a great depth of soil, and in which no obstruction of this kind is found, it is however not unusual to plough very deep, and to have a second plough following in the furrow of the first, so as to throw up new soil, and to bury that which is supposed to be exhausted: as is the case in many parts of Devonshire.

In fine, it will, in most cases, be found inexpedient to add to the stratum already under tillage by any other means than those which little by little may gradually tend to increase the depth of vegetative mould by the mixture of small quantities of the virgin earth of the subsoil with the surface; but if a more extensive operation be contemplated, then the following questions may be not unsafely put before coming to a conclusion.

1st, What return may be expected from land, the subsoil of which has not yet been submitted to the plough?

2ndly, What change will be occasioned, either by the increase or diminution of the tenacity, or of the friability of the land, by the admixture of the subsoil with the surface?

3rdly, What quantity of manure will be required beyond that already disposable upon the farm?

And 4thly, What will be the entire cost?

To solve which, the earth should either be submitted to a chemical analysis, or its qualities ascertained by spreading some of it, to a certain depth, in a garden, and sowing seeds upon it. The probable improvement in the soil may thus be ascertained, and the supposed increase in the future crops, when compared with the expenditure, will determine the propriety of the experiment.

We have not hitherto touched upon the subject of the *actual depth to which ploughing is commonly carried*, nor is it necessary to say much regarding it; for it of course depends more upon the state of the land and the judgment of the farmer than upon any general rule. The usual operation is generally confined to from four to five, and rarely exceeds seven inches; though, in the hundreds of Essex, and some other districts where the soil is rich and deep, it is sometimes carried as far as nine. An opinion is indeed entertained that, if carried deeper, more manure is necessary to ensure a crop; and it will be readily admitted that, were this idea well founded, it would form a strong argument in favor of moderate depths. It is, however, only justly applicable to land of which the subsoil is inferior to the surface; for when this is of the same quality with the cultivated part, not only can no injury arise from gradually incorporating it with the tilth, but benefit will be derived by all plants which penetrate far into the ground, as they naturally absorb their nutriment both from the soil and the manure with which it is mixed. It must, however, be admitted that when ground is suddenly ploughed to an unusual depth, it increases the difficulty of destroying weeds. This is particularly observable in thin stapled clays, on which they spring up as if indigenous to the soil; it is therefore obvious that no benefit can be derived from ploughing such land deeper than common, unless it be done in the manner we have already pointed out.

ON THE NECESSITY FOR PROPER INSTRUCTION IN THE ART OF REELING SILK.

To the Editor of the Farmers' Register.

Philadelphia, Feb. 26th, 1840.

DEAR SIR—I am exceedingly obliged to you for the valuable present you have been pleased to make to me of a series of the Farmers' Register, for 1839, and January No. of the present year: I beg you will accept for it my grateful thanks. Although I do not profess to be an agriculturist, yet I have always felt the liveliest interest in the progress of agriculture, considering it as the nurse of mankind, of which commerce and manufactures are but the handmaids.

I am happy to find that you pay considerable attention to the culture of silk, an article to which this country will one day be indebted for immense riches. The great question at present is, how to make it profitable? I observe in the last number, for January, that it is not doubted but that a great quantity of cocoons will be produced in the course of the present year; and there can be no doubt of it when we consider the large bounties given by some of the states for their production. But, it is asked, what shall we do with them? To this question your correspondent answers, by recommending to the farmers to reel their silk from their cocoons; but he does not say how that reeled silk is to be employed. I presume that he believes that it will be immediately manufactured. Your correspondent is very sanguine on the subject; he says that he has seen silk reeled by an American farmer who had never been taught the art, which was mistaken by a connoisseur for Italian silk. I should be very happy if this should prove to be the case; I have, however, strong doubts upon the subject. I believe the art of reeling silk from the cocoons requires teaching and experience, and that it is not to be learned by intuition. Whether I am right or wrong, this is an important question, which has produced in this country many different opinions, and which ought at last to be set at rest. I am happy to have it in my power as a first opportunity now offers to decide it definitively.

In our large cities, and in several country places, from Boston to Philadelphia inclusive, there are manufactories of sewing silk, with competent machineries, directed by skilful throwsters, chiefly emigrants from England. These factories, going on under the protection of a duty of forty per cent. on foreign sewing silk, are in great want of the raw material, and are obliged to import it in large quantities from China and Bengal. This foreign article, which is by no means of the first quality, sells in our market for \$5 a pound. Now, sir, it is very plain that there will be no market this year for the purchase of cocoons, as there is no filature established any where that I know of; but there will be an abundance of markets for the purchase of reeled or raw silk; and if that reeled by our farmers is equal to the Italian, it will readily sell for \$7 a pound, which is the price of Italian raw silk in England; and if inferior, it will at least produce the same price with China silk, which is \$5. There cannot be a fairer opportunity to test this long controverted question, and ascertain the real value of American raw silk. It is only by such facts that the correctness of the discordant opinions can be finally decided upon.

I beg you will excuse my employing another

hand to write this letter; the weakness of my sight obliges me to have recourse to this method. Again accept my thanks for your very valuable present, and believe me to be, very respectfully, dear sir, your most ob't servant,

PETER S. DU PONCEAU.

[In the circumstances in which the venerable writer of the foregoing letter has been placed by age and infirmity, its dictation was a task which we did not expect from, nor desire to have imposed upon him. Being so freely performed, however, it is so much the more gratifying, and valued, as a testimonial of the writer's kind approval of our labors, and of his still unwearied zeal for the establishment of the public benefit by silk-culture, which is the subject of his remarks, and to promote which, he has been one of the earliest, most zealous, and certainly among the most disinterested of laborers.

Mr. Du Ponceau maintains, as heretofore, the difficulty of the art of reeling silk, and the necessity for its being regularly taught. In this he is opposed by the much more general belief of the great facility with which the art may be acquired. Being totally without practical knowledge on this controverted point, we offer no opinion of our own, but wish to present fairly the opposite opinions of others. But whether the difficulty may be too much magnified by the one opinion, or too much underrated by the other, there can be no doubt of the immense advantage of a skilful and experienced reeler commencing the operation in a region where silk-culture is but just begun. Many places in the middle and southern states will this year offer profitable and sufficient business for a single capable reeler, though it might not be safe to establish a regular and extensive filature in advance of the large and regular business of feeding worms, which we trust will proceed with regular increase from the trials of this year. In all the principal towns of Virginia, Richmond, Norfolk, Petersburg, and Fredericksburg, good reelers would this year find extensive employment in the crops of cocoons that will be made in the environs, and would make for themselves good profits, both by their work and by instructions of others, as well as render most important public service. For the latter object, as well as for individual benefit, in the instruction afforded, each considerable feeder of silk-worms in the vicinity might well afford to pay his share of a large pecuniary premium to induce the establishment of a reeler, in addition to the payments for particular services rendered. This ought to be an object especially attended to by societies formed for aiding the promotion of silk-culture.—ED. F. R.]

SKETCH OF THE CAUSES OF THE PRESENT FINANCIAL PROSTRATION OF THIS COUNTRY.

"Again: is it not equally clear that it was the magnitude of the surplus [revenue,] and not the removal [of the deposits] of itself, that caused the after derangement and disorder? If the surplus had been but two or three millions, the ordinary sum in deposit, it would have been of little importance where it was kept; whether in the vaults of the bank of the United States, or those of the states; but involving, as it did, fifty millions and more, it became a question of the highest importance. I again ask, to what is this great surplus to be attributed, but to the same cause? Yes, sir, the tariff of 1828 caused the surplus, and the surplus the removal and all the after disasters in the currency, aggravated, it is true, by being deposited in the state banks; but it may be doubted whether the disaster would have been much less, had they not been removed. Be that, however, as it may, it is not material, as I have shown, that surplus itself was the motive for the removal. We all remember what occurred after the removal. The surplus poured into the treasury by millions, in the form of bank notes. The withdrawal from circulation, and locking up in the vaults of the deposit banks, so large an amount, created an immense vacuum, to be replenished by repeating the issues which gave to the banks the means of unbounded accommodations. Speculation now commenced on a gigantic scale; prices rose rapidly, and one party, to make the removal acceptable to the people, urged the new depositories to discount freely, while the other side produced the same effect, by censuring them for not affording as extensive accommodations as the Bank of the United States would have done, had the revenue been left with it. Madness ruled the hour. The whole community was intoxicated with imaginary prospects of realizing immense fortunes. With the increased rise of prices began the gigantic speculations in the public domain, the price of which, being fixed by law, could not partake of the general rise. To enlarge the room for their operations, I know not how many millions, (fifty, I would suppose, at least, of the public revenue) was sunk in purchasing Indian lands, at their fee simple price nearly, and removing tribe after tribe to the West, at enormous cost; thus subjecting millions on millions of the choicest public lands to be seized on by the keen and greedy speculator. The tide now swelled with irresistible force. From the banks the deposits passed by discounts into the hands of the land speculators; from them into the hands of the receivers, and thence to the banks; and again and again repeating the same circle, and, at every revolution, passing millions of acres of the public domain from the people into the hands of speculators, for worthless rags. Had this state of things continued much longer, every acre of the public lands, worth possessing, would have passed from the government. At this stage the alarm took place. The revenue was attempted to be squandered by the wildest extravagance; resolutions passed this body, calling on the departments to know how much they could spend, and much resentment was felt because they could not spend fast enough. The deposit act was passed, and the treasury circular issued; but, as far as the

currency was concerned, in vain. The explosion followed, and the banks fell in convulsions, to be resuscitated for a moment, but to fall again from a more deadly stroke, under which they now lie prostrate."—*Debate in Congress.*

MALARIA AND MILLPONDS.

To the Editor of the Farmers' Register.

Washington County, N. C. Jan. 6, 1840.

The 'Essay on Malaria' I read when it first made its appearance, in the sixth volume of the Register, with great interest. I thought I knew every word of it to be true, from long observation and suffering from the ignorance of those facts in early time. But for more than twenty-five years I have been fully convinced of the great cause of most of our sickness in this country—stagnant water, and mud exposed to a hot fall sun; and have spared no labor and cost in my power to avoid them. One of the strong reasons for moving my house at —, from my father's location, was to get it farther from the — river swamp, and though it was but two hundred and fifty yards, I have no doubt of having long since been remunerated for the cost in the health of my people, though it has been but six years. It is a work which ought to be in the hands of every man who lives in the low country, or bilious fever region of our country. I hold the right of property inviolable, except in cases of life and death; but were I living in the neighborhood of a millpond, I should consider the right of property in it no more than that of a tame bear, that was devouring my child. To calmly sit by and see all one's children and dear companion as pale as corpses, in a short time violent disease, and, after watching with the utmost anxiety, to follow to the grave those dear objects of your love, perhaps one after the other until all are gone, and to know that all those heart-rending sufferings arise from the malaria of the various millponds in your neighborhood, must evince a degree of forbearance beyond Christian, and an obduracy of heart, in the owner of mills, almost equal to that of cold-blooded murder. If I know any thing that would induce me to accept the dictatorship of a country, it would be that of having the power to constrain the inhabitants in the bilious fever region to remove all stagnant waters from it, and to keep all arable land in the fall covered with vegetation, and thereby sheltered from the power and influence of the sun. * *

For the Farmers' Register.

BULLETING FOR SPAYING.

Little Rock, Ark. Dec. 27th, 1839.

I have tried spaying pigs with shot. [Described in an article in the Farmers' Register.] The experiment has been tried by Mr. William Wilson also, and other careful farmers in this vicinity; and, so far as I know, every experiment failed to produce the desired effect. I am fully of the opinion it is not worth the attention of the farmer.

ALLEN MARTIN.

**PRACTICAL RESULTS, AND OPINIONS THENCE
DERIVED, ON SILK CULTURE IN DELA-
WARE.**

To the Editor of the Farmers' Register.

Dagsboro, Delaware, Feb. 18, 1840.

In answer to your inquiries as to my silk culture, I may say I have been, or rather Mrs. Waples has been, somewhat engaged in it, for about three years. When I first commenced the business, my object was to introduce the culture of it into our county, believing then, as I now do, that it would be of an incalculable advantage to a district of country like ours. I began by raising the white Italian mulberry, for food for the worm—presuming then, from information received, that that species of mulberry would suit our climate, doubts then being entertained whether the *morus multicaulis* would stand our winters; consequently I had procured many of the white mulberry, upon which I have principally fed my worms. Two years ago, I procured some of the *morus multicaulis*, and have turned my attention mostly to the cultivation of them, and am progressing with them for standard trees as food for the worms. I have had no intention from the beginning of speculation upon the *morus multicaulis*. I sold a few to two of my neighbors, which about paid me for the first cost of mine. From some cause, which I can't account for, the cuttings of one and two buds which I planted last spring, nearly all failed; but as things have turned out, my loss will be nothing; for I have enough for my own use, and to sell them would be next to impossible. The great rage for speculation in that article has, for a while, played the mischief with the progress of the silk culture; as the great loss of speculators has caused many, very many of the people (otherwise well disposed towards the rearing of silk) to believe that it is all a humbug. These, you know, are the days of humbug. But now is the time for those who intend rearing silk, to stock their farms with the *morus multicaulis*. I intend to keep a goodly number of the white mulberry for a resort, if necessary. I find not much difference in the two kinds for food; but in the gathering, one hand can gather more food from the *morus multicaulis*, than five hands from the Italian mulberry. The worms are fond of both of these species, and they make equally as fine silk; but from the easy propagation and the facility of procuring the food, I much prefer the *morus multicaulis*. I fed last year about 300,000 worms. The cocoons were fine, of good size, and of a fine texture; said by judges to be equal to any they ever saw. I propose this year, if nothing happens, feeding from half a million to a million of worms. Heretofore I have kept no account of expenses or cost of any thing in the premises; I have gone on in this business entirely with my family, and in a manner not to interfere with my other business; making this business almost entirely an extra one—having done the principal part of the work with a negro woman and black children, the latter of whom, but for this business, would be doing little or nothing. I propose keeping an account of all the ins and outs this year—and if I should live, will try and give you a particular account of our doings in the silk for the year 1840. This much I am fully persuaded of, that it can be made a profitable business, and particularly in a family

way. There is no doubt with me, but that every family in our community might raise from fifty to one thousand dollars worth of silk a year, (according to the numbers of the family,) with but very little interference with their ordinary business. If so, and I have no doubt of it, if it could be generally introduced, what an amount of money would it come to yearly? I have now full faith in the *multicaulis* standing our winters; mine thus far are not injured the least, although our winter has been what we call a hard one. At some other time I will give you my idea on manuring and farming.

With sentiments of the highest respect, your friend,
WM. D. WAPLES.

**DELIGHTFULNESS OF THE CLIMATE OF SOUTH-
ERN FLORIDA, GOVERNMENTAL NEGLECT
AND ABUSES, AND THE MEANS OF REMEDY.**

To the Editor of the Farmers' Register.

*Indian Key, Tropical Florida,
1st January, 1840.**

A happy new year to you! But what a contrast between the weather and vegetation of Petersburg at this very hour, when compared with the weather and vegetation of Indian Key. Can you realize the fact that this coral rock of twelve acres is covered with ever-verdant foliage and ever-blooming flowers? On the 12th December, 1838, my family embarked amid the cold desolation of the season at New York, and on the 25th December, 1838, my family arrived, amid the cheering consolations of the same month, at Indian Key. My many years of previous residence in tropical climates debarred me from enjoying all the pleasure of absolute novelty in this speedy transition from the leafless vegetation of the snowy hills of New York to the evergreen woods of the never-frosty Keys of Tropical Florida. But my Northern family was greatly astonished and highly delighted with the magical change, from the cold and gloomy scenery of December in the latitude of New York, to the warm and brilliant scenery of December in the latitude of Indian Key. They have now passed one year and five days amid the physical enjoyments derived from the weather and vegetation alone of Tropical Florida; and they are now as well convinced as I am myself of the superlative delightfulness and the superlative healthfulness of the tropical climate of South Florida. They have relinquished the society of their friends and acquaintances at the pleasant village of Palmyra, Wayne County, New York; they have spent a year at this village islet of six families, in my temporary dwelling, which has necessarily been my family fortress or domestic prison; and they are still as anxious as I am myself to be transferred to the still more solitary enjoyments of the desert wilderness on the adjacent mainland of the Peninsula. All men who are practically acquainted with the first settlement of any new country must well know that, during the first years, their own minds and their own families must necessarily constitute their only "good society." He who cannot find sufficient enjoyments in his

* Lat 24° 48' N. Long. 80° 55' West. Heat 70° to 72° Fahrenheit.

own head, with his own family, or in his own hands on his own lands, is not fitted for a pioneer in any new settlement, and especially in the southern extremity of Tropical Florida. But such are the attractions of even a desert wilderness with a tropical climate under our free government, that even my children now can appreciate the great trouble of my frequent dreams at Campeachy. The great affliction of these perverse imaginations consisted in their whirling me from the Gulf of Mexico over the Peninsula of Florida, and in finally dashing me down amid the snow and ice of the Peninsula of Michigan! And even now the greatest annoyance of my troubled dreams always consists in their malicious transportation of my shuddering frame to the frosty regions of the northern states. How many years have I fruitlessly labored to convince the American people that the most slandered section of their immense domains is the most desirable district in the union for the physical enjoyments of the human race. Would the Seminole savages cling so pertinaciously to the slandered everglades of South Florida were they not in reality the most desirable district in the United States for the physical subsistence of the poorest people? Superadd intelligent management to physical labor in this productive climate, and an earthly paradise on the poorest lands may soon be created by the poorest hands. During my travels in the Northern States, in August, 1838, I visited the costly garden and costly hot house of the reputed possessor of millions of dollars. The extravagant expenditure of ostentatious wealth was exhibited even in the sashes of varnished mahogany and the panes of plate glass which surrounded his magnificent collection of tropical plants. Very natural, however, was my incidental remark, that the poorest man in Tropical Florida could easily collect a much finer exhibition of tropical plants around his humble habitation. Indeed you will readily conceive that the garden of Eden itself must have been located in a tropical country. Did you ever dream of any frost or ice among the bowers and flowers of the first garden, of the young world? How long would any naked couple remain alive in any garden of Virginia? The fig leaves which formed the first clothing of Adam and Eve, were not they the gigantic leaves of the fig banana, now growing on this coral rock of Indian Key? And whence came the thread to stitch these leaves together, unless from the *petioles* which compose the stalk of the same banana? When these first poor people of the young earth were driven out of the first garden into the universal wilderness of the eastern world, they become the pioneer squatters on public lands. Yet remark and remember, there was *not* then any vegetable mould, there could *not* be any rich black soil, on any surface of the recent earth: yet vegetation flourished; and these pioneer squatters of the human race found sufficient subsistence in the desert wilderness of the eastern hemisphere. I allude to these primitive facts, in this primitive style, because all emigrants to Tropical Florida must be pioneer squatters on public lands. The first squatters of the United States were the pioneer settlers at Jamestown and at Plymouth; and degenerate must be the descendants of those pioneer squatters, if they dread the minor privations and minor dangers of pioneer squatters near Cape Sable and

near Cape Florida. As truth is mighty and must prevail, I have no doubt that in a few years Tropical Florida will be densely crowded with poor propagators of perennial plants. All that is requisite to attract emigrants in shoals is to make them effectually acquainted with the irrefutable realities of the superlative delightfulness of the tropical atmosphere, and the superlative productiveness of the calcareous earth of South Florida. Yet, such is the force of the national prejudices of national ignorance, that I have been compelled, through the senator and representative of South Florida, to suggest to the legislative council of the territory, the urgent expediency of their official corroboration of the irrefutable reality of the superlative healthiness of the delightful climate of Tropical Florida!!! Yet, after all, the first settlers of South Florida will likely be composed of the most intelligent men over forty years of age, who have much travelled experience of the United States and of other extensive portions of the world. An emigrant from the Atlantic states, after five years' residence in the North Western States, three years' residence in the South Western States, two years in Texas and one year in Cuba, will much more likely become a contented permanent settler in the desert wilderness of Tropical Florida, than any other person with less personal experience. Such a settler will be sustained, like the ancient Israelites in the sandy desert, by confident faith in his future enjoyment of the fig and the vine, the milk and the honey of the promised land. Like the Christian of all ages, he knows that he must pass through the shadows of tears to emerge into the lights of joys; that he must travel through a narrow, rugged path, to reach the broad blooming garden of Eden. You will hence readily conceive that very few native inhabitants of our Atlantic states can possess the requisite qualifications to render themselves happy in Tropical Florida. He or she who would not cheerfully reside in the original wilderness of Virginia, for the virtues of a medicinal spring alone, cannot cheerfully reside in the desert wilderness of South Florida for the virtues of its tropical weather alone. Indeed I would advise South Florida to be avoided by every person who cannot cheerfully abstain from the use of tea, coffee, chocolate and sugar, until he can produce them with his own hands!!! Yet there are philosophical minds in the travelled bodies of some actual residents of the Atlantic states, which can appreciate the enjoyments of even a desert wilderness with a tropical climate under a free government. They know that even the primitive earths of any tropical district abound with vegetable wealth and beauty. They know that in a tropical climate the most valuable vegetables are spontaneous productions of the most arid soils; and that *water* alone is the only essential auxiliary to the most luxuriant vegetation of the most precious plants of the whole world! You know that the whole vegetation of infant creation was the natural generation of universal irrigation!! When "the Lord God planted a garden eastward in Eden," and when out of the primitive "ground" he thus "made" to grow every tree that is pleasant to the sight and good for food, he also made a river to water the garden, in which he put the man "to dress it, and to keep it," by easy irrigation! Indeed, wherever the ancient country of Eden may now be placed by modern travellers,

you can probably quote their incidental observations, which will clearly show that the principal earth of each conjectural location is the calcareous earth of Tropical Florida! Your own pen has frequently shown the astonishing fertility of calcareous earth with simple irrigation; and your own pen can clearly explain the momentous fact, of national importance, that the vivifying waters of the slandered everglades are liquid mines of vegetable wealth for South Florida. You know that a verdant oasis in an arid desert is barely the vegetative result of a spring of water in a waste of sand! The ancient and modern histories of the eastern hemisphere abound with facts which prove that wherever water was brought into any desert, vegetation flourished, population accumulated and cities rose; and that wherever water was withdrawn, vegetation decayed, population perished and cities fell!

You have quoted Madden's Geological Observations in the desert between Egypt and Judea, which sustain his belief that a solid bed of limestone is the basis of the soil of all Egypt; and Denon's Geological Observations on the Lybian range of calcareous mountains, which show the facts that their daily decomposition furnishes the calcareous sands which gradually encroach on the cultivated plains and populous villages of the productive valley of the Nile, and dreadfully change those scenes of vegetation and population into sites of barrenness and of desolation. Yet you truly remark, that wherever, by canals, are conveyed the waters of the Nile to irrigate the calcareous sands of its arid borders, an astonishing fertility has been the immediate consequence; and that wherever these canals have ceased to convey these waters, those calcareous lands have again become naked and barren sands. But by my communications, you have perceived that the basis of the soil of all South Florida is also a solid bed of limestone; that the arid sands of all South Florida are also calcareous sands; and that hence an astonishing fertility of even its naked lands must also be the immediate consequence of appropriate irrigation in South Florida; and you can therefore appreciate the vast importance of my principal position for the vegetative improvement of Tropical Florida. "The fertilizing waters of the mosquito-less everglades are more elevated than the sterile sands of the mosquito-full coasts; and hence the same canals will drain the excessively humid soils of the interior, and will irrigate the excessively arid soils of the shore; and they will thus distribute the appropriate proportion of fertilizing moisture for the most flourishing vegetation of the whole slandered surface of Tropical Florida." Indeed whenever a governmental survey of this slandered district shall be finally ordained, the special surveyors must possess all those extraordinary qualifications which can only be acquired by long observations in the regions of irrigation, in the south of Europe, the north of Africa, or in Tropical Asia. South Florida is an extraordinary country, with every thing extraordinary in its geographical position, in its geological formation, in its chemical composition, in its substratum and subsoil, in its surface and surface soil, in its tropical climate, in its tropical vegetation, and even in its tropical animation, from the minute insect of its coral rocks, to the huge manati of its calcareous coasts. The position, then, is self-evident,

that an extraordinary country requires extraordinary legislation by extraordinary legislators. But in the congress of the United States, what member of either house has extraordinarily studied the extraordinary phenomena of Tropical Florida, with the single exception of the scientific senator, Doctor Linn? An extraordinary country requires extraordinary government by extraordinary governors. But under all our successive governments of the United States, what member of any cabinet has possessed the extraordinary qualifications for an extraordinary appreciation of these extraordinary circumstances of Tropical Florida, with the single exception of the travelled statesman, the actual secretary of war? It is furthermore self-evident, that in any extraordinary country the extraordinary extirpation of ferocious beasts must necessarily be accomplished solely by extraordinary hunters with extraordinary premiums: and that hence, with such motives by such men alone, will ever be caught, or even sought, the savage murderers in South Florida, at the only sites where they can ever be found. Now, he that hath ears to hear, let him hear! He that hath understanding to study, let him study! The same extraordinary circumstances which have forcibly prevented, and which will forcibly prevent, the agricultural settlement of South Florida, the same extraordinary circumstances have greatly prolonged and will greatly prolong the Seminole war in South Florida. The extraordinary governmental privation of desert freedom to individual industry in the deserted district was the principal occasion of the beginning of the Seminole war, and is the principal cause of the continuation of the Seminole war in the same deserted district. The extraordinary circumstances of the only private population of South Florida in their only locations and only occupations along this wrecking and this rumming reef, readily afford positive proofs of their extraordinary interests in the extraordinary prolongation of this extraordinary war. The extraordinary circumstances of the only public troops in South Florida in their only positions and their only operations along this rumming and this wrecking reef, naturally afford presumptive proofs of their extraordinary interests on the extraordinary prolongation of this extraordinary war. But the extraordinary combination of these extraordinary circumstances, along this extraordinary wrecking and rumming reef, very naturally produce extraordinary considerations of dependent interests, defenceless timidity and scheming policy, which necessarily disincline and disqualify almost every private resident from the patriotic discharge of the dangerous duty of nationally public promulgation of locally notorious facts. Hence the same extraordinary combination of extraordinary circumstances necessarily generates the extraordinary result, that locally notorious facts of nationally immense importance cannot ever be officially proved to the executive departments in Washington. To this extraordinary promulgation of extraordinary realities, I now add the extraordinary individual position of extraordinary national importance, that the immediate restoration of desert freedom to the deserted district of South Florida is an essential means for the speedy termination of the Seminole war.

Very respectfully, your ob't. serv't.,
HENRY PERRINE.

**DANDOLO'S WORK IN ITALIAN. DOMESTIC
INDUSTRY AND PRODUCTS OF ITALY. CAL-
CARREOUS SOILS FOR VINES.**

To the Editor of the Farmers' Register.

Habersham County, Ga., Feb. 17, 1840.

You have expressed a desire to obtain a copy of Dandolo's work on silk, in the original Italian. I have sent a copy of it to my father at Washington, with a request that he will forward it to you by the safest conveyance. If you need it only for a limited time, I should be glad to get it again, as, in this country, this work is rarely found. If, however, it is very necessary to you, I presume you would prefer keeping it. This you can do, as it will be of more public benefit in your hands than in mine.

You may desire to know how this book (the only one perhaps in the United States of the kind) found its way into the heart of the mountains of Georgia. I will tell you, as it will serve as an introduction to a remark upon the cultivation of another article too much neglected in our agriculture, viz: the grape. Several years ago, then little more than a boy, I found myself in Italy. One of my chief pleasures consisted in visiting the small farmers whenever I could find an excuse for entering their dwellings, and conversing with them in imperfect Italian. This was not often; but I learned nevertheless with surprise, "that the silk and Leghorn plait, [for bonnets, &c.] made by the women and children of a Tuscan farmer's house, often constituted all their gains; that bad crops, taxes and the landlord's share, frequently took all the profits and left him nothing." I learned moreover, that the sum total of the amount gained to the state by these "small operations," was no small sum, and, added to the produce of the olive tree, might be said to constitute the chief means of existence of the poorer class. These facts produced one of those undefined dreams of patriotism, to which I believe all young men are subject, and under its influence I bought this book, studied it, and otherwise obtained knowledge on the subject, with the vague idea that it would be one day useful. It is likely to turn out so.

The whole soil of southern and middle Italy is more or less calcareous, either naturally, or from volcanic ashes. And in no place, that I examined, did I find a peculiarly fine vineyard but in a soil highly calcareous, and very deep, (either naturally or made so,) and generally very dry. The vine which produces the *Lachrymæ Christi* wine, grows on a perfect heap of volcanic ashes and scorise, very light, and very dry. The finest grapes I saw in Naples, grew on the ashes of the Monte Nuovo; and some parts of Champagne in France, producing the finest wines, seemed to me altogether of marl, in a state of dust. Upon these views, I tried a small experiment last summer.

I had two beds in my garden dug two feet deep. They were separated by a broad walk, which had never been dug, so that there could be no communication between them, unless through 18 inches of solid red clay on each bed; I transplanted there vines as nearly under the same circumstances as I could. They did not thrive well, having no manure of any kind. Early in the summer, I put on a very large quantity of lime (well slacked

and left in the air for some weeks,) on three of them. In the fall, the vines thus treated were twice as large as the others, and the leaves were green during a drought of six weeks. The soil was six inches of sand on a subsoil of stiff red clay, on the top of a hill as poor and as dry as can be found any where. The lime was all the manure the vines had, and that in quantity sufficient to have killed most plants.

I shall leave the six as they now are, and in the course of time, inform you of the results of the experiment. An isolated experiment can only help to establish a fact. It is with this view, that I state the above; and not that I consider it either a discovery or even novelty.

Excuse this hurried and ill-digested letter; I had no intention of troubling you, with so long an epistle. I could not leave off in the middle, and I could not spare time to commence another, and be in time for the mail.

I am, sir, yours respectfully,

R. W. HABERSHAM, JR.

[We take the liberty of publishing the above letter, because of its matter of public interest, though it seems to have been meant as a private letter. It was elicited by an advertisement which (after trying in vain all other means) we placed on the cover of the January No. of the Farmers' Register, requesting to be furnished with a copy of Dandolo's treatise in the original language. On February 29th, the book above promised was received, and for which we are greatly obliged to Mr. Habersham's kindness. It is, however, not the original work which was especially desired, but an abridgment of Dandolo's first edition, by another hand. Still, it affords to some extent the means of proving and correcting many of the numerous errors of the French and English translators and copiers of Dandolo; and if to clear away something more of the enormous mass of error so derived, and heretofore received without question in this country, will be a service to silk-culture and to agricultural interests, we trust that Mr. Habersham's anticipations, of his favor to us leading to public benefit, will not be disappointed.

Mr. Habersham has struck upon the true secret of the cause of the superiority of European vine-culture and wine-making. At sundry places in our past volumes, we have offered the same opinion, and urged the cultivating the vine in this country on calcareous soils. His experiment is interesting, and doubtless will present results that will show the great benefit of even superficial liming to vines. But if the new calcareous ingredient had been diffused through the whole two feet depth of dug earth, it would have been much better. For we are satisfied that a highly calcareous subsoil, as low as the roots will penetrate, as well as the upper soil being calcareous, is necessary to the greatest perfection of vine-culture.

But even if made sufficiently calcareous, the original subsoil of "stiff red clay" will never be made favorable to grape-culture, as if sandy and gravelly.—Ed. F. R.]

NATURAL CAUSES OF THE UNNATURAL FALSEHOODS OF THE UNHEALTHINESS OF THE CLIMATE AND UNPRODUCTIVENESS OF THE SOIL OF THE FLORIDA KEYS.

To the Editor of the Farmers' Register.

On the authority of Williams, the tropical islands called the Florida Keys, commence in 25° 35' north latitude near Key Biscano, and terminate in 24° 32' north latitude at the Tortugas Shoals. By the same authority, the longitudes of the same points counted west from Washington, are 3° 13', and 6° 10' west longitude. In other words, the Florida Reef has a curving extension through 63 miles of latitude and 177 miles of longitude south and west of Cape Florida. Now the whole extent of this desolate reef has always been infested by wreckers and by drinkers to so great a degree, that it merits the exclusive title of the wrecking and rumming reef of South Florida. Hence, at the acquisition of the territory in 1819, the only population of the Florida Keys was necessarily a transient population—a cruising population—an exclusively wrecking, fishing and drinking population. They were hence a greatly anti-agricultural population with greatly anti-salutary habits; and hence they could not, or would not discover any agricultural productiveness in the calcareous soils of these arid keys; and hence, also, they could and would attribute any fatal results of the habitual imbibition of liquid poisons, to their habitual inhalation of the noxious miasma of an unhealthy climate. They saw that these rocky islands were densely covered with the most vigorous growth of the most valuable trees, and yet they said that these soils were barren soils. They were constantly destroying the most precious woods of the tropics, and yet they declared that the islands on which they grew were entirely composed of the most unproductive soils. They were constantly plundering the most valuable naval timber of the world, and yet they cried that the soils in which they flourished were entirely worthless soils. Various vegetables for food were indigenous to the soil, and other edible plants ran wild on these keys, and yet, these anti-agriculturalists maintained that these productive soils were sterile soils. Genuine mahogany, Campeachy teak, tropical mastic, more valuable than the celebrated live oak under the special protection of the United States government, have hence continued to be destroyed during the 20 years that these invaluable trees have been within the jurisdiction of the United States' government. A single acre of these slandered keys is naturally covered with tropical plants, which, in the green houses and hot houses of the northern states and of Europe, would be worth from one thousand, to one hundred thousand dollars. And yet these calcareous islands continue to be regarded as *totally unworthy of any serious attention* by the government and by the people of the United States.

Respectfully yours, &c.,

HENRY PERRINE.

Indian Key, T. F., Jan. 20, 1840, heat 68°.

WINTER FALLOW.

From the (London) Library of Useful Knowledge.

The labors of winter fallowing, when intended for the preparation of spring crops, though conducted nearly in the same manner as those already detailed, are necessarily more confined in their operation: seldom, indeed, exceeding three ploughings, and not unfrequently consisting of only two; for it is a prevalent opinion that light soils—particularly if they be of a sandy nature—are frequently much injured by being overworked; and it is clear, that they neither require, nor will bear, to be more pulverized than may be absolutely necessary for the destruction of weeds and the production of a good seed-bed. If the land, however, be of a firmer nature, and especially if it partake of the qualities of loam, the best practice is to give three ploughings, the last of which is preceded by the effectual operation of the grubber; for although strong loams with a good bottom, having been once thoroughly cleaned by a well-wrought summer fallow, may afterwards be kept in order by drilled crops, yet to maintain them in that condition requires the most constant attention and the most careful management, or they will again inevitably become foul.

The first of these ploughings should be given as soon as possible after harvest, and if it can be effected early in the autumn, then a second with a deeper furrow can be given in the course of the winter: the grubber follows when the weeds have begun to sprout in the spring, and the last ploughing is the seed-furrow.

It is thus that the sowings of the spring crops should be prepared; but on many farms both time and strength are wanting, and the tenants are obliged to content themselves with two ploughings, of which the first is not unfrequently very imperfect. Oats being a common crop on poor land, and being put into the ground early, are very commonly sown in this manner; but this species of culture is evidently insufficient for the destruction of weeds, or for the due amalgamation of the manure with the soil; so that the dung is sometimes found in the following year in hard lumps, like turf, which are not broken up without much difficulty, and it consequently cannot afford nourishment to the ground until the following crop. Those who trust to dung for the production of good crops of corn, should also consider, that unless the ground be previously relieved from the load of weeds with which it is encumbered, they can never expect it to produce the same benefit that it would if it had been brought into proper order.

It has not been unaptly remarked by a man of known experience in husbandry, that the science of agriculture is nothing more than an endeavor to discover and cure nature's defects; and the grand outlines of it are—"how to make heavy land lighter, and light land heavier; cold land hotter, and hot land colder. He that knows these secrets is a farmer, and he that does not know them is no farmer."* From want of attending to these general ideas, many absurd doctrines have however been propagated concerning it, and in no instance more than in that of fallowing land, which it has been very common to condemn in the gross, as a mere

* Davis's Survey of Wiltshire.

waste of labor and loss of crops. If by fallowing be meant repeated summer ploughings, it follows that on some lands it is proper, and on others totally wrong. It can never be right to make land lighter that is too light already; but there are few instances where strong heavy land can be pulverized too much. It may be replied that this pulverization may be as well effected under crops as in a state of fallow. On some soils it may; on others it cannot. In veins of rich sand, it has been found to be totally improper: such land will not bear a summer fallow; for it can never be made too close, if it can be kept clean; and on such a soil, this can be done better with a crop than without one.*

With regard to the system of fallowing in the northern districts of the kingdom, it is considered by most intelligent farmers as not generally suited to the more tenacious clays of the southern counties of England. The fallow-land on such soils, they contend, should not be broken up before it is dry in April or May; for if ploughed in autumn, and if the winter prove open, with much rain, it retains the moisture, becomes soured, and requires much trouble to get it dried for cleaning in spring. The treading of the cattle on such land, while ploughing, also does much mischief, for the impression of their feet will hold water when taking up the last two furrows of a ridge, and will, in a great measure, prevent the proper turning over of the furrow slice. In wet seasons the horses should, therefore, be always driven in the furrow. In some situations it is, no doubt, an easy matter to lay aside fallows, and to raise wheat after green crops; but we are borne out by the opinion of practical agriculturists of great eminence, in saying, that no man, who is generally acquainted with the soil and climate of Great Britain, will attempt to explode their use altogether. The essential points of tillage—besides preserving the land in heart with manure—consist in keeping it dry by drainage, and clearing it of weeds; if fallowed steadily, with perseverance and judgment, they are sure to succeed; but if negligently or imperfectly performed, no land, however cheaply rented, can leave a living profit to the farmer.

Having thus stated our opinion on the expediency of fallowing, we should be wanting in candor if we neglected to advert more particularly than by general mention of its opponents, to the opposite practice pursued for some years past, on heavy land, by the late Thomas Greg, Esq. and General Beaton: the details of which, although already before the public, are so pertinent to the subject of this chapter, that a further account of it cannot, we think, be deemed misplaced.

Greg's System.

The farm of Coles, near Buntingford, in Hertfordshire, consists of 240 acres of arable land, which is described as "a very tenacious clay, in some places mixed up with calcareous earth, which causes it to bind at top after heavy rain;" and was formerly worked nearly under a three course system of summer fallow, white corn, and

pulse, or clover. Turnips were seldom sown, as the difficulty of feeding or carting them off was found to be injurious to the succeeding crop; and, consequently, only a small flock of 80 ewes or 140 wethers was kept, which was constantly folded during the summer. Upon this, and the observations regarding the disadvantages attending the similar plans of his neighbors, it is unnecessary that we should here offer any remark, for we know that they have been in many instances improved, and our more immediate object is to state the system afterwards adopted by Mr. Greg, and since followed by his nephew, during upwards of twenty years.

Having, as he tells us, "established in his mind as a general principle, that fertility was to be derived from pulverizing the soil, clearing it from water, and keeping it clean, he proceeded to inquire how those objects were to be obtained at the least expense; and he found that the best method to promote them was to reverse the whole system of the former cultivation." Accordingly, instead of ploughing four or five times only in summer and spring and fallowing every third year, he formed the determination "to plough only once for a crop; to plough only in winter; never to fallow the land in summer; to practise the row culture, and to use the horse-hoe." The mode in which he carried his plan into execution was as follows.

He divided the farm as nearly as possible into six equal parts, which are cultivated in a six-course shift, consisting of turnips; barley or oats; clover, standing two years; peas or beans, upon the ley; and lastly, wheat. The ground is marked out by a drill into ridges of five and a half feet in width, intersected by furrows often inches wide; thus leaving only fifty-six inches for each land, which is worked by a Suffolk swing plough, formed upon a construction to cut a perfect trench of seven inches deep, and requiring four bouts to complete the ridge, which is made sufficiently convex to describe an inclined plane of three inches from the crown to each furrow.* Thus water is prevented from remaining upon the land intended to be cropped, by being drawn into the ten-inch furrow, which is carried two inches deeper; the horses never tread but in a furrow; and by the soundness of this ploughing Mr. G. states, that, "when effected in the autumn or before Christmas, a perfect friability is obtained in the tilth by the influence of the frost during the winter, and the surface water may be as effectually got rid of as by under-draining."

As soon as the harvest is completed, the wheat-stubbles are haumed, and the lands are marked out and ploughed one bout: dung is then ploughed in to the amount of ten loads per acre, and three bushels of winter tares with a bushel and a half of winter barley are sown, to precede turnips to the extent of about half the ground intended for that crop, which, in common seasons, it does not impede, as the tares are cut upon a moist soil for the turnip sowing.

The tare sowing being finished, the bean and

* In common fields, where the course is two crops and a fallow, or, as in some, three crops and a fallow, the report says that "on such soils, the fallowed year fills the land with more weeds than can be got rid of in the succeeding round of crops."—Surv. of Wills., p. 56.

* Thus the first bouts are ploughed only four inches deep, which bouts are turned into one forming eight inches of soil in the centre of the lands. The second bout to be ploughed up to it, should be five inches deep; the third six, and the fourth nearly eight inches. See the Frontispiece of Mr. Greg's Pamphlet descriptive of the process.

pea stubbles are prepared for wheat; which is a difficult operation on heavy land, when the object is to get the seed early into the ground. The labor which they require from the plough, roll, and harrow, was so great as to induce Mr. Greg to use a powerful grubber, or scarifier, of a form which covers an entire land; and it performed so well that he has since continued to use it instead of the plough, as he found that he could thus sow forty acres of wheat in a very few days, regardless of weather, and at a sixth part of the expense.

Having sown the wheat, the remainder of the land intended for turnips is ploughed and dunged. The ploughing is also performed for peas and beans; and it is desirable that these operations should be completed before Christmas. As soon as the season turns, the land which was ley, and intended for beans and peas, is scarified; and when the growing weather commences, the beans are drilled at fifteen inches for the convenience of horse-hoeing. The peas are next drilled; but as these, by falling over, preclude the possibility of hoeing them more than twice, they are sown at intervals of twelve inches.

As the ground is cleared of turnips, it is ploughed into lands. In the spring, the barley is drilled in rows of eight inches—not leaving any space for furrow—and the clover and rye-grass is sown up, and then across the lands.

As soon in May as weather permits, and the sun is sufficiently powerful to kill weeds, the scarifier is set to work, succeeded by a strong harrow; and having by these operations obtained cleanliness, the first favorable weather is made use of to sow Swedish turnips, or, should they fail, they are succeeded by white turnips, and in the event of a further miscarriage, coleseed is sown. With these, and the assistance of about ten loads of clover, and ten weeks' run on pasture in bad weather, 500 sheep are now kept on the farm, but lie enclosed at night in a spacious and well-littered yard. The fodder produced by straw and clover hay supports from forty to fifty head of cattle, and nine working horses are kept, which are soiled during the entire summer: thus so large a quantity of dung is made that no manure is purchased.

In this manner 200 acres are ploughed between harvest and Christmas, besides the cartage of dung and other odd jobs on the farm; but this is easily performed with the aid of the grubber, and the land being entirely ploughed in the winter, there is only the sowing of Lent corn to execute in the spring: the horses are therefore put upon green food, by which a considerable saving is made in the consumption of corn. Many other details of management are given in Mr. Greg's pamphlet, which is brief and well worthy of attention, but which we refrain from enumerating, as we only meant to call attention to the extraordinary statement which it contains of such a system of culture having been so successfully pursued upon land of that nature, as to yield an average, during six years, of the following crops, namely:

Wheat	- - -	25 bushels.
Barley	- - -	40 "
Beans	- - -	35 "
Peas	- - -	90 "
Clover twice cut	-	2 tons.

Thus, after the deduction of rent and the interest of 2500*l.* capital, preenting, upon an average of six

years, a profit of 671*l.* 3*s.*, or 2*l.* 15*s.* 11*d.* per acre, and a result in favor of his mode of cultivation of no less than an annual difference amounting to 638*l.* 18*s.**

Of the accuracy of the minute account thus furnished by Mr. Greg, we have no reason to doubt, though we confess ourselves somewhat sceptical regarding the justice of the conclusions which he has drawn respecting the superiority of his own plans over those of his neighbors; for every man, however high his honor and impartiality, is yet unconsciously biased in favor of any pursuit of his own, and no farmer could live upon the profit which he has assumed as that of cultivation under the old plan. On a subject of such vital importance to agriculture as that of the fallow system, we indeed deemed it prudent to apply to the present Mr. Greg for further information, which he readily afforded; and, from recent personal communication and correspondence, we are assured by him, "that his uncle's system is still pursued upon his farm with the best effect; as is evinced by the clean condition of the land, the heavy crops produced, and the quantities of stock maintained. The only alteration of importance made in his mode of cultivation subsequent to the publication of his pamphlet, was the substitution of a seven years' course, in place of that of six years, by which he obtained two crops of wheat—one on the clover ley, and another after the beans and peas. The annual course of cropping in the several years now, therefore, stands thus—

- | | |
|----------------|--------------------|
| 1. Turnips. | 5. Wheat. |
| 2. Barley. | 6. Beans and peas. |
| 3 and 4 clover | 7. Wheat. |

No material alteration has been made in the implements; nor was any fallow permitted so long as the late Mr. Greg's health allowed his superintendence of the farm; but the bailiff now occasionally follows the field of the heaviest land: this, however, is only resorted to when the land sown with turnips has not been prepared in time for the barley crop, and only averages about 16 acres a year out of 250."

Beaton's System.

Knowle Farm, in the neighborhood of Tunbridge Wells, which was a few years ago in the occupation of the late General Beaton, contains about 300 acres of land, of which 112 are arable, and is described as abounding with clay, and retentive of surface moisture, but when dried by the summer heat it becomes as hard as a brick, and impervious to the plough, unless with a great power of animal exertion, particularly as the general mode is to plough deep. The established rotation in that part of Kent and the neighboring portion of Sussex is fallow, wheat, and oats, with occasionally clover and rye grass; and the husbandry appears to have remained unaltered for ages, with the single exception of substituting lime for manure instead of marl. Upon this system the farm was managed during the general's absence while governor of the Island of St. Helena; and finding on his return, in the year 1813, "that he had no cause to boast of its profit, he re-

* It may, however, be observed, that at the period when Mr. Greg's account was published, wheat sold at 9*s.* the bushel, or 50 per cent. more than it does at the present period; whilst the cost of labor, including the increase of the poor's-rate, is scarcely reduced.

solved to trace the whole progress of the operations, from the commencement of the fallow to the close of the rotation; the result of which was, that "having made a series of experiments to which he devoted his attention during five years, he determined upon the total abolition of fallows.*

In order to effect this, he adopted several implements, chiefly of his own invention, for a description of which we must refer to his 'New System of Cultivation,' as we have only seen the scarifier in use. This is of a light construction, and certainly performs well; though, upon land such as that described by the general, it is worked by a pair of horses, and sometimes more, instead of one.

He conceived that the grand source of all the heavy expenses of the old method might be traced to the fallow itself, and to the mode of preparing it—"by bringing up immense slugs with the plough, by reversing the soil, and thus burying the seeds of weeds that had fallen on the surface, by which a foundation is laid for all the subsequent laborious and expensive operations." To avoid these, he therefore thought it necessary to proceed in a different manner—"to only break and crumble the surface soil to any depth that may be required; to burn and destroy the weeds; after which he would have the land in a fine and clean state of pulverization, and in readiness for receiving the seed, without losing a year's rent and taxes; and all this at a mere trifle of expense when compared with that which is incurred by a fallow."

In pursuance of this, he reduced the ploughing to a single operation at the depth of four inches. The chief use, indeed, which he made of the plough was to open furrows at twenty-seven inches apart, which was performed by a couple of horses at the rate of three acres per day, and was merely intended to prepare the land for the scarifiers, "which, by passing twice across these furrows, loosen all the stubble and roots of weeds, which are afterwards, with a small portion of the soil, placed in heaps and burned." By these means, together with the more frequent repetition of the horse-hoeing and the introduction of the row culture, the general assures us "that his lands were rendered much cleaner, and yielded better

* His experiments were extended to various objects besides the working of the land; particularly to the combinations of different kinds of manure, and the burning of clay, (for which, see our vol. i, chaps. 16 and 17); but our present extracts only extend to the subject of fallowing, the charges of which he states to have amounted to 16l. per acre, thus:—

Labor, breaking up the clover ley and three subsequent ploughings	£3 12 6
Eleven harrowings at ten acres per day	0 9 0
Manure, one and a half wagon load of lime between the third and fourth ploughings	7 10 0
Carting and spreading ditto	0 6 0
Seed, two and a half bushels of wheat at 10s.	1 5 0
Sowing and rolling	0 1 6
Rent and taxes for the year of fallow	1 10 0
Ditto for the year of crop	1 10 0
	£16 4 0

See his 'New System of Cultivation,' together with Supplement, containing plates of several machines invented by him; some of which will merit attention.

crops than they did formerly, after all the heavy expenses of lime and fallows."* He indeed states, that these operations produced the effect of pulverization to the depth of six or seven inches, and their expense was—

	s.	d.
Five scarifyings, with a single-horse implement, at 1s. 8d. per acre	8	4
Two harrowings, at 10½d.	1	9
	10	1

that the whole charge of cultivation, under a four-course system upon this plan, including rent, was—

	£.	s.	d.
Tares, beans, peas, &c., per acre	5	0	0
Wheat	5	0	0
Oats and barley	3	13	6
Clover and rye grass	2	15	0
	16	8	6

thus only amounting to a trifle more than that of the fallow upon the former plan; that land cultivated upon his farm in this manner has yielded 460 sheaves of wheat per acre, whilst the average produce of the other fields did not exceed 360; and that the difference in favor of the new method amounts, upon an average—when wheat is at 10s. the bushel—to 350l. per annum upon the cultivation of 100 acres.

On the cultivation of these farms we have no observation to offer, except that they both merit attention. That belonging to Mr. Greg, although described as a tenacious clay, yet must be land of a superior quality, or it could not support the course of crops under which it has been cultivated; it has now, however, been continued under the same system for a number of years with distinguished success; and, without offering any opinion upon the plan, we conceive that similar experiments, upon a moderate scale, are fairly entitled to a trial. Regarding Knowle Farm, we have no information since the decease of its late proprietor; but the account which he was left, though inconsistent with the established practice of farming, and appearing, in some respects, not likely to be advantageously continued, yet contains hints which perhaps might be carried into effect without impropriety. Whether really deserving of imitation, or not, we at least do not consider ourselves entitled to withhold them from our readers, in a work professing to give an account of the practice of the United Kingdom.

* On this subject he also observes, that "those who plough deep, and bury the seeds of weeds by the first ploughing, are not aware that, by this outset of their fallow, they lay the foundation of a great deal of labor and mischief, and bring upon themselves the absolute necessity of a fallow, as the only means of eradicating the progeny of those seeds which they have inadvertently deposited deep in the soil. Now, if the whole of the stubble and its roots, with a small portion of the surface soil which must contain those seeds, be collected and destroyed by fire, it is reasonable to suppose that the lands might be as effectually cleared of weeds in this manner, as by a summer fallow; besides they would have the benefit of a considerable portion of ashes. Perhaps, also, this mode of burning might have a tendency to prevent the disorders with which my crops have not been in the smallest degree affected."—2d edit. p. 90.

From the (London) Library of Useful Knowledge.

A GLOUCESTERSHIRE HILLFARM. COMMUNICATED BY MR. JOHN MORTON, CHESTER-HILL.

Introductory Remarks.—On the formation and general character of soils.

Soil is formed by the mixture of decayed vegetables with the surface of the earth, and is clayey or sandy in proportion to the quantities of clay or sand with which the vegetable matter or mould is mixed. It differs from the subjacent soil or sub-soil, according to the quantity of vegetable matter which it contains: but it partakes of the nature of the sub-soil. When the soil rests upon rock, it is supposed to have been gradually formed by the decomposition of the rock on which it rests. The nature of the soil will, therefore, partake of the nature of the rock. And whether the sub-soil is rock, gravel, sand or clay, the soil above it partakes of the same nature and properties in a greater or less degree. If the sub-soil is rock, the soil partakes of the nature and properties of that rock whether it is calcareous, silicious, or clayey. In like manner, if the sub-soil is a calcareous clay, a gravelly clay, or a sandy gravel, such is the soil; it is silicious, calcareous or clayey, as the sub-soil is. The nature of the sub-soil may, therefore, be easily known from the nature of the subjacent rock or sub-soil.*

The connexion that subsists between the soil and the subjacent rock or sub-soil is, in our opinion, of great importance, and would form the best foundation for a classification of soils, as conveying some idea of the nature and quality of the materials of which the soil is composed.

Sub-soil may either be of a compact, and retentive nature, preventing the rain or water that may come upon it from percolating through it,—such as clay, till, lias, limestone, and some other kinds of rock; or it may be of a loose, friable, and porous texture,—such as gravel, sand, and open rubbly rock. In the former case, it is easily affected by the alternations of dry and wet weather, and if near the surface, is of little value for the production of corn; in the latter, if also near the surface, the moisture of the soil is easily exhausted by heat and drought, and the plants *burn*, as it is called, or decay for want of nourishment.

A shallow soil is soon affected by the nature and texture of the sub-soil; and the greater its depth it is the less so, and, therefore, the better calculated for the purposes of cultivation.

Soils are, therefore, affected not only by their own depth, but also by the texture and quality of their sub-soils. The best sub-soil is that which is dry, friable, and porous.

General character of the oolitic formation.

The geology of the kingdom is now so well known, and the direction and boundary of each of the formations so well defined, that a selection of farms along the line of each of the several formations, would not only be the most scientific and

* An exception, however, must be made of alluvial soils, or such as have been conveyed from a distance, in the case of which the above correspondence between the soil and sub-soil does not hold—at least universally.

comprehensive mode of proceeding with giving “a detailed view of the principal agricultural systems of England,” but also by far the most useful to the practical agriculturist. Were accounts given of the different modes of culture practised on the different formations, and classed together according to the individual formations they describe, the student, in search of practical knowledge, would have the advantage of being enabled at once to refer to a variety of modes of management, pursued on the same sub-soil and nearly the same soil, and to select that which might seem the best adapted to his own particular case.

The principal feature of the county of Gloucester is the western boundary of the Cotswold hills, which is formed by the outer edge of the oolitic rock. In it there are a number of recesses, exhibiting a great variety of forms, and giving to the landscape of the county its peculiar character. These recesses opening into the great valley of the Severn, finely ramified, and extending a considerable way into the table-land, form deep, and beautiful valleys. These deep valleys, and the uniform inclination of the sides of the hills, give its beautiful and picturesque scenery to the county of Gloucester. These hills are very steep on the west side, but form a table-land or fall very gradually on the east. On this table land the Thames and the Isis take their rise, and wander eastward upwards of a hundred miles, before they reach the level of the tide; while in the west, the Severn, with its rapid tide, flows within about five miles of the edge of the hills, and, at the shortest distance, within fifteen miles of Thames’ head. The Cotswold district is bounded on the west by the edge of the hills, and may be said to extend from near Bath to Moreton in the Marsh, varying in breadth from five to twenty miles. The sub-soil of this district being calcareous rubble, lying on the oolitic rock, (termed, provincially, Bath or freestone,) which is also calcareous, is open and dry, and readily permits the water to pass through it. The soil seems to be formed from the decomposition of the rock on which it lies, and partakes of its calcareous nature. It is loamy, shallow, and full of stones, seldom allowing the plough to enter more than four or five inches below the surface.

The eastern side of the Cotswold is composed of corn-brash, or forest-marble, which lies above the oolitic rock, and consists of beds of limestone, generally very thin, and divided by partings of calcareous clay, lying between strata of calcareo-silicious sandstone. Its beds are thin and slaty. Sometimes, however, beds two or three feet thick may be found. It is composed of dark-colored shells, interspersed with white oolitic particles. It is generally used as a coarse roofing slate, and as flagstone; but the more solid and thick beds are sometimes used as a coarse marble, being variegated by its imbedded shells.

The soil on the corn-brash or forest-marble is more tenacious in its nature, and generally of better quality than that on the oolitic or freestone. Thin wet clays, however, of the most worthless kind, are frequently to be met with on it, rotting sheep, if pastured on them, and seldom, if ever, repaying the expense of cultivation, if ploughed. Although the soil on the corn-brash contains a portion of silicious sand in its calcareous clay, it is of a binding and tenacious nature, clinging to the feet in wet, and baking into hard lumps in dry weather;

and in continued drought, the ground is rent open to the depth of the soil. This district, in most parts, is bleak and bare; but in others affords a short fine grass for pasture, and is generally well calculated for producing the crops which the arable farmer cultivates. The same formation with its soil and sub-soil extends from Crewkerne through the counties of Somerset, Gloucester, Oxford, Northampton, Rutland and Lincoln, to Barton on the Humber, with but very little variation in its nature and quality.

The general elevation of the Cotswold hills is from 500 to 800 feet: some of them rise to the height of 1100 feet. The climate is remarkably mild considering the elevation and nakedness of the district, there being very few hedges with hedge-row timber, the inclosures being chiefly formed by stone walls.

Tillage.

Tillage is an operation by which the soil is intended to be pulverized, to have a new surface exposed to the influence of the atmosphere, to be cleaned from weeds, and manured, and thus to be prepared for receiving the seeds of the plants cultivated by the husbandman. The land becomes foul and unproductive, when this operation is not properly performed. Tillage, therefore, holds a prominent place in the business of the arable farmer; and the character of the crops will depend on the manner in which it is executed.

The plough, the drag, the harrow, and the roller are the instruments universally employed by farmers in executing this work; which ought to be effected in spring and summer, when the ground is dry, when the influence of the sun and air will assist the farmer in accomplishing his object, and the earlier in spring it is accomplished the better. The principal object is to keep the land perfectly clean, that none of the virtue of the soil may go to the production of weeds; for if weeds are allowed to grow, all the labor, as well as the manure bestowed on the land will only tend to produce a greater quantity of them, and to reduce the land to a worse state than it was in before.

Land should never be ploughed in a wet state, for this not only gives encouragement to the growth of weeds, but also gives sourness and adhesiveness to the ground. Some soils will admit of being much wrought or pulverized by the plough, &c., in eradicating the weeds, and preparing them for the seed; while on others this would have the effect of nearly producing sterility, at least for one season. The intelligent farmer will adopt that mode of tillage which is best adapted to the peculiar nature of the soil he has to do with.

Cropping.

The course of cropping is regulated by various circumstances. The kind and quality of the soil, and its peculiar properties; the seasons, the most profitable application of manure; and the fact that no white or corn crop should be repeated in too rapid succession, are circumstances that always govern the prudent farmer in the adoption of a system. But the value of every rotation depends chiefly, if not entirely, on the quantity of food that is produced, during the course, for sheep and cattle, but particularly for sheep; and on its consumption on the farm, either in the fold or the stall. "No food, no cattle; no cattle, no dung; no dung, no

corn," is a maxim that ought to be fixed in every farmer's mind. Turnips, vetches, clover, and saintfoin are indispensable in every good course, as winter, spring, and summer food; and the greater the crops of these are, the greater and more productive will be those of corn. These crops, of which the turnip crop is the principal, may, therefore, be considered as the foundation of all good husbandry.

In every system it is absolutely necessary to attend to the equal distribution of labor throughout the year; so that the work, which the system requires to be performed in each month, may be easily accomplished by the means you are provided with. The different operations should never be allowed to encroach on each other. If these are properly adjusted, the business of each week will be confined to the time in which it is required to be performed: regularity and economy in labor will be the consequences, followed by reciprocal improvement of soil and stock.

Description of the farm.

We have selected the farm of Beverstone, not only because there are most of the varieties of soil on it that are to be found on the whole range of the oolitic formation; but because we think that the mode adopted in the cultivation of this farm is well calculated for any farm on this formation; and because the diligence and economy which is practised in every department of the management are well worthy of the attention of every farmer in the kingdom.

Beverstone Farm, consisting of upwards of 1300 acres, is situated two miles west of Tetbury, Gloucestershire, on the Cotswold hills. The general aspect of the farm inclines to the south-east. It is all inclosed, and the fences, which consist principally of stone walls, are always in good order. The buildings, too, are kept in the best state of repair. A degree of neatness reigns over the whole farm; and, in every department of the establishment, order and regularity are maintained.

The system of farming, adopted by Mr. Jacob Hayward, the farmer, has grown out of the experience and observation of past years. It is not the offspring of fanciful theory; but of actual, continued, and successful practice for many years; and the result has been to the advantage both of tenant and landlord.

The following are the sorts of soil on this farm:—

1st. A thin wet clay, of a most adhesive nature, covering the thin fissile till-stone. Of this sort there are about 220 acres, the greater part of which is very worthless. The whole used to be under the plough; but has been laid down to grass—the greater part since 1820. It has proved so unsound for sheep, and so apt to rot them at certain seasons of the year, that they are seldom, if ever, permitted to enter upon it. It is, on this account, of little value, and is pastured by young beasts.

2d. A light stony soil, above the oolitic rock. In some places this soil is about four inches from the calcareous rubble; in others it is not more than two or three; but so irregular is its depth, and so variable its quality, that in a field of twenty acres, three or four acres of the same kind and quality are not to be found together. When the soil is deep, it is frequently of a dend or 'fainty' sandy nature, of very little value. The best sort of this stony soil is that in which the stones that are turned up with

the plough are of a darkish color; when they are whitish, the quality is very little worth.

3d. A soil, that has a good deal of clay in its composition, and of some depth, being neither too strong for turnips, nor too light and thin for beans. Of this, 57 acres are of natural grass, over which water can be partially thrown during the time of floods, and which are generally mown; 130 acres more are occasionally mown, and when not, they are pastured by cows and other stock. The remaining 40 acres, of this sort, are arable.

Of the whole farm about 400 acres are in pasture.

The farm-buildings are very inconveniently situated, the greater part of them, including the dwelling-house, being at the north side of the farm. There is a barn and a court near the south, and another barn and a court near the west side. But, from the extent of the farm, the greater part of the land is at a great distance from the buildings; so that, in carting either dung from the courts to the field, or corn from the field to the rick-yard, the average distance is about three-quarters of a mile. The whole of the wheat is always carted to the barn-yard nearest the house.

Tetbury is a market-town of some note; but very little dung can be got from it. One year, however, upwards of 300 cart loads were conveyed from it to this farm; but the expense of carting it and of collecting it in the town, together with the price paid for it, amounted to a sum, which the increase of produce from it did not cover; and after two or three years of trial the plan was given up. The only manure, therefore, which is used upon this farm, is what is made by the stock kept, by the cleanings of the ditches and road-sides mixed together, and by the feeding off of all the turnips on the ground by sheep. This last is found to be the most valuable manure for this sort of soil. Lime has been tried upon this land, but with little or no effect, owing, perhaps, to the soil being composed, principally, of calcareous matter.

[Conclusion next month.]

SPEECH OF DR. C. T. JACKSON.

Geological Surveyor of Maine, New Hampshire and Rhode Island, at the Second and Third Agricultural Meetings.

Dr. Jackson began by expressing the pleasure he had in these meetings for mutual information and improvement; and he augured the most beneficial results from the active spirit of inquiry which was now so generally awakened.

Agriculture is yet to derive immense advantages from scientific cultivation. The first element in agriculture is the soils, which constitute the seat of its operations. The soils which the earth presents, and which in different localities are found very differently constituted, although the same simple elements enter, to a certain extent, into the combination of all of them, are among the most important objects of inquiry and examination to the intelligent farmer.

Soils are, properly speaking, only the *detritus* or broken substance of decomposed rocks, intermixed in various degrees with organic matter in a state of dissolution and diffusion. The breaking down and the comminution of the rocks, so as to form the fine particles of the earth, have been the progressive results of the influence of air, moisture and

frost, exerted through many ages which have passed and still in constant and active operation. That the earths were derived from the disintegration of rocks, he deemed conclusively established by the fact, that by the chemical and indeed microscopic examination of soils, they are found to consist of the same elements which enter into the formation of the rocks. In soils derived from granite were found quartz, feldspar, and mica; and the decomposition of slate rocks produces clay. The presence of limestones and porphyry serves in each case to produce a peculiar soil.

All the various mineral bases have an influence upon the character of a soil. Some of these minerals undergo a decomposition and enter directly into plants: silex, alumine, magnesia, all enter into plants; and silex, as is well known, forms the coat or skeleton of all graminaceous plants, or otherwise of plants belonging to the family of the grasses. These elements have much to do with the fertility of a soil.

The enriching mineral substance found in New Jersey, alluded to in a former discussion, is what is called a green sand, composed of silex, potash, and iron. It yields potash, and thus neutralizes any acid substances which may exist in the soils, to which it is applied.

Every observing traveller in passing through different countries, perceives that the soils of different countries possess properties peculiar to themselves. Thus limestone soils seem most congenial to the production of wheat; and granitic soils to that of grass. Each rock may be traced by its peculiar vegetation. The soils on the trap-rock formation in this state, are distinctly marked.

A great part of the state is of what is called the diluvial formation. In this case there is an evident removal of the earth's surface or soils by some violent convulsion in a sort of wave, from the north to the south. The proofs of this deluge in its advances south may be distinctly traced. Thus in a diluvial formation the soils will be found to be composed of the same elements as the rocks some miles distant to the northward of that place; and may be very different from the soil, which might be said to belong to the place, where they are found. As evidence of this movement south, the rocks in the vicinity of Providence are evidently formed from the disintegration of rocks of the graywacke formation some distance to the northward. The graywacke rocks are those composed of other rocks of various descriptions collected together in a miscellaneous combination, and cemented by a kind of argillaceous paste. In Maine there are abundant proofs that the whole soil of the country has, in many places, been removed southwardly. In Thomaston the soil is evidently of diluvial formation. Portland rests upon a formation of mica and talcose slate; but the soil is granitic and evidently transported from the vicinity of Brunswick.

The diluvial soils were transported by some extraordinary change in the earth's surface, produced, it may be, by a deluge or some similar catastrophe. Alluvial soils are formed from the washing of high places into those which are lower, by rains or freshets, and take place by a gradual deposit of earths or sands from water thus rendered turbid. The diluvial soils have a higher antiquity than the alluvial. The fertility of alluvial soils is owing, in a considerable measure, to the fine comminution of the particles of which they are composed. This allows the

roots of plants to spread themselves freely. There is much vegetable matter mixed up with them, though these soils are not remarkable for its abundance. Upon an examination of the alluvial soils of the Mississippi, the Ganges, and the Nile, they are found nearly to resemble each other, with the vegetable matter contained in them in a finely divided state.

The mixed elements of soils have a powerful action upon each other, and upon the plants which grow in them. Their earthy parts have an electro-motive power, which operates not only by the roots but by the leaves. A fertile soil consists of elements in a positive and a negative electric state, fairly balancing each other. If the soil is acid, it is barren; if alkaline, barren. The acid is in a negative, the alkaline in a positive electric state. Vegetable manures become acid or negative; animal manures positive or alkaline: they must be combined in order to produce the best result. When peats alone are used for manuring soils, the results are not always favorable. Farmers pronounce it a cold substance. In its natural state it abounds in acid properties and produces sorrel. We may render this substance one of the most valuable of manures by suitably preparing it, according to the experience of many farmers. Peat should be combined with some alkaline or basic substance, which will neutralize the acid which prevails in it, and then it will supply an abundant nutriment to vegetables. Peat is composed of mosses which grow and then continually decay, giving place constantly to succession of these sphagnum plants, intermixed with leaves and decayed trees. They abound on the sea-board. Swamp mud resembles peat in proportion to the decayed vegetable matter which it contains; and is adapted to supply the manure we want.

Peat being dug out, another growth of it comes forward, and after a while its place is supplied again. On Block Island, where it abounds, it is used altogether for fuel. In this place the peat contains 98 per cent. of vegetable matter. Our peats contain from 80 to 97 parts of vegetable matter. Swamp mud consists of vegetable matter and earth, making a good manure when its acid properties are neutralized. Several farmers in the neighborhood of Boston have experienced its value. Peat can be substituted by proper management for manure. A distinguished farmer says that farming cannot be carried on in his location without peat. Two farmers within his knowledge have mixed three parts of peat with one of stable dung. By mixing it with lime and animal manure, ammoniacal gas is produced, which dissolves the peat and converts it into a powerful manure.

Lime is highly useful in its application to soils. In bone manure it is found in combination with phosphoric acid. The crenic and apocrenic acids unite with it and form manures. All manures before they act become converted into salts. Soils are in an acid or neutral state. Large tracts of country, which are now barren, by proper applications might be rendered fertile. A farm within his knowledge, which was a blowing sand, a pine barren, and almost hopeless, on which ten bushels of corn to an acre could scarcely be grown, by the judicious application of ashes, has been made to produce forty to fifty bushels to the acre.

The Dr. here illustrated his position by giving the chemical analysis of certain soils in Rhode Isl-

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and, which it is understood will be presented to the public in his report in a detailed form. Methods should be taken to render the insoluble matter in soils soluble, that it may be taken up by the plants; and it is desirable that this process should proceed gradually. If acidities abound in the soil, correctives must be applied. It is easy to convert one quality of soil into another. The value of geological investigations is not properly estimated.—An analysis of soils is greatly wanted. The statistics of agriculture are greatly wanted. Farmers are not exact in their observation of their crops.—Many valuable agricultural districts are bottomed upon clay. This is desirable in order to preserve the manures which are applied to them. In soils where the manures applied pass through them by infiltration, much loss is sustained; and they are not favorable to agricultural products. This infiltration of manures is doubted by some, but the condition of our wells proves it. The water in a barn yard is never pure. As much as a teaspoonful of vegetable matter to a gallon is often obtained from waters which are considered pure. This may be seen by any one who will evaporate the Boston water to dryness. In the purest water obtained from lakes, $1\frac{1}{2}$ grain of vegetable matter to the gallon may be obtained. In the water of Boston, 38 grains are found to the gallon. Soils brought from 150 feet depth in this neighborhood, are found charged with vegetable matter.

Land with a foot of top soil on a gravelly substratum may be unproductive. This is the case with the soil on Seekonk plains, which has a foot of soil containing 11 per cent. of vegetable matter; but manures applied pass through it by filtration; and it suffers from drought.

All our waters come from the top soil. Clay is a retainer of water. Bog iron ore is found in soils and is prejudicial to vegetation. There is a ready way for a farmer to test his water. By the application of a solution of lunar caustic to a glass of water, if it contains vegetable matter, it will become red. Distilled water will not exhibit this appearance.

Saline matters abound in soils in the form of carbonates, sulphates and phosphates. Lime is an important amendment to the soils by causing it to furnish nutriment to the plants. It is a chemical re-agent and decomposes manures and does not, as has been supposed, form insoluble matters. In the ashes of wheat, lime exists to the amount of 15 per cent. It is found in some proportion in all soils. The carbonate of lime is a valuable amendment to soils and especially to those which contain iron or copperas. Gypsum is a powerful stimulus to vegetation. Lime in the form of a carbonate is easily applied. The management of lime is too generally misunderstood. Fields perfectly barren have been rendered fertile by the use of it. There are few exceptions to this fact in Rhode Island. In some cases its application has been triumphantly successful, and in many cases of failure, the lime has been found to be highly magnesian. There are various matters connected with these subjects which will furnish excellent texts for discussion hereafter.—The action of manures is particularly important. Science here is of great importance. Certain acids in soils have been discovered by Berzelius. The crenic and apocrenic acids. These are found in the soils of both hemispheres; in the soils of the Mississippi and the Nile. These soils closely re-

semble each other. The soil of the Nile contains 2.8 per cent. of the carbonate and phosphate of lime. The soil of the Mississippi has less iron and more clay.

The introduction of science into agriculture has been of great benefit. How soils are to be rendered fertile or how corrected, have hitherto been matters of empiricism. We should desire to act understandingly, not ignorantly.

The changes which take place in the progress of the growth of plants are remarkable. In the germination of the seed, carbonic acid is given out, and oxygen absorbed. After the leaves are formed, they absorb carbonic acid and give out oxygen. When the plant ripens, they give out carbonic acid and absorb oxygen. All manures act on the foliage. If plants are overstrained they fail to produce fruit. It is important to find the proper point or limit of manuring. A distinguished gardener engaged to produce a geranium leaf as large as a cabbage: it was effected, but the plant perished in the effort.

Bleaching powders or chloride of lime, are a powerful manure, and produce astonishing effects on vegetation. The ammoniacal gas or sal volatile operates powerfully upon plants, and this matter is produced by the fermentation of barn manures.

In soils which are porous, it is advisable to use manures in a long state. The manures which are obtainable are different in different places. Experiments have been made with bone manure, lime, and ashes, and, as reported, with different results. There are, undoubtedly, differences in soils, which affect their operation. These subjects deserve inquiry and observation. Agricultural observations should be made exact and certain. As the pursuit becomes intelligent it rises in dignity. Why should farmers be ignorant of their great art, when it is the aim and boast of every other profession and pursuit, to study their art thoroughly? Agriculture may be rendered scientific; and science well applied must conduce to render it more profitable.

Facts in these matters are of the highest importance. In Maine ashes were thrown away. The Long Island farmers are willing to send to Massachusetts to obtain them. The intrinsic value or efficiency of the material cannot be affected by the different estimation in which they are held. Peat we see in some places is highly esteemed as a manure. In many places it is utterly neglected; and this can arise only from ignorance of its value or of the proper mode of applying it.

Facts, he repeated, are of the highest importance. Peat in a crude state, is not suited for application to the land. It must be decomposed, and its acidities corrected. A farmer in Rhode Island has made much use of swamp mud compounded with fish, the Menhaden, which are taken in their bays in great abundance. To eight cart loads of swamp mud or peat, he applied one barrel of fish. This compost is denominated fish-pie. The rotting of the fish decomposed the peat and the peat absorbed the ammoniacal gases, which escaped from the decayed fish. The farmer deemed this mixture of equal value with the best of unmixed barn manure. On a level field, planted with corn at right angles, every row manured with this compost was distinctly observable, and was eight times as large as that part dressed with hog manure. At

the harvest the crop from the rows manured with this compost gave an increase over the other parts of the field of fifty per cent. Any decaying animal substance, on being mixed with it, will produce a decomposition of peat.

The physiology of vegetation is a subject deserving of much attention. The mode in which plants receive their nutriment from the soil is not, as has been supposed, by capillary attraction, but the vegetable food in a liquid form is forced into the minute vessels of the plants by an electric or voltaic agency. This is the discovery of a Frenchman by the name of Detrochet, and is called by him *endosmose*. [Dr. Jackson here illustrated this matter by a small apparatus.] This operation is at once suspended by the presence of certain substances, such as sulphuretted hydrogen or one drop of fecal matter in the vessel. Acids and alkalis in their combination act as galvanic batteries, and forward the process of vegetation.

The physiology of plants should be studied by the farmer. Innumerable, curious and wonderful operations are continually going on before him. No situation is more favorable than his to intellectual and moral improvement; and no employment more interesting than the contemplation of the phenomena of the natural world.

The green sand spoken of is as difficult of solution as the feldspar in granite. In Sweden the carbonate of potash is used to decompose the nitrate of lime, which is formed in their artificial nitre beds, which are similar to compost heaps. Nitre is produced abundantly in our dung heaps. Many other salts are produced by chemical changes, which are continually going on in the earth and air. The putrefaction of animal and vegetable substances is productive of various changes, and of substance useful in vegetation. The crenic and apocrenic acids are always found in soils, and the degree of their presence when ascertained, will indicate the applications to be made to the land.

The skeletons of all plants and animals have lime for their bases. Silix gets into plants in a manner altogether mysterious. It is found in all plants with hollow stems, such as many of the grasses, in wheat and the cereal grains, in bamboo and flags. The crenic and apocrenic acids operate to dissolve silix. The absorption of plants is not wholly by their roots, but by their leaves, which are the lungs of plants and gather the carbonic acid gas from the air, and its carbon is converted into solid wood. Nature pursues her operation in one eternal round, and all things combine mutually to assist and modify each other. Plants are highly beneficial to life and health, in absorbing and decomposing the elements of the air, and returning that portion which is necessary to respiration and life.

Agriculture is yet to make great advances in this country. The value of peat lands is very imperfectly understood. A farmer in the vicinity of Boston, distinguished for his scientific and practical skill, has obtained one hundred bushels of corn to the acre upon redeemed peat meadows; and obtains from these lands an income of ten to twelve per cent. profit. Land might be cultivated with much more skill and to much higher profit in proportion to the skill applied. Liquid manures among us are almost entirely wasted. Night soil is often thrown away, and yet it is one of the most efficient of manures. With all our advantages, we bring

Indian corn from Africa, and the country of the Nile furnishes us with peas and beans.

The population of China is immense and supported wholly from the soil. The allowance for a China man is indeed small, as three dollars per year will serve to keep soul and body together; but even to earn this, every person does and must work. Among this people agriculture is carried to an extraordinary degree of perfection. With us too large a portion of our people are devoted to trade; and the pursuits of rural industry are deserted for the hazards of speculation and commercial life. As we cross our breeds of cattle that we may improve our stock, it would be fortunate if we could so cross our farmers and merchants that the habits of exactness in keeping accounts and the enterprise and spirit of progress, which distinguish the mercantile classes, could be in some measure transferred or infused into our farmers.

Great advantages seem to result from the mere mechanical mixture of soils, as for example, of sand with clay, or clay with sand. This seems to affect their electro-motive power and induces absorption in the plant. Besides the combined acids which exist in soils, there is often much free acid which requires to be taken up or neutralized. There is much siliceous matter in all soils. The oxides of different minerals abound in soils. These have different electric powers, which require to be understood and regarded. Many soils which have been thought to contain no vegetable matter, have been found upon examination to contain eighty-six tons of vegetable matter to an acre. Fields of barren sand have been rendered productive by the application of alkaline substances. These soils have been ashed, and portions of vegetable matter have been removed by two successive crops. In some soils there is a large amount of vegetable matter in an insoluble state. In this case it must by some application be rendered soluble, and this can easily be done.

The geological formation of soils is of much importance. A soil with a loose substratum must lose much by infiltration.* The farmer will find great advantages from the chemical analysis of his soils. A gross analysis will not show the differences which exist. It must be conducted with a refinement of skill and care. The influence of half a bushel of gypsum spread upon an acre of land has been known to render it fertile. It seemed a mere drop in the bucket, yet it produced a surprising difference in the crop. Gypsum has not the same effect on all soils. If the soil abounds in the ingredients which are applied, they are thrown away. If a soil, for example, contains 1.5 per cent. of phosphate of lime, it does not require the application of bone manure. So of lime where lime abounds.—The soil of the banks of the Nile, probably the most

fertile in the world, contain only 2.8 per cent. of lime. The saline manures, such as carbonates, sulphates, phosphates, &c. are absorbed by the plants. They act as stimuli to vegetation; and change the soil so as to render it fertile. Saline manures do not act always in the same way. They act principally on the foliage. They excite action in the plant, and carbonic acid gas is absorbed. The decomposition of vegetable substances gives out carbonic acid gas, which is immediately seized upon by the plants. Large amounts of ammoniacal gas are obtained from the putrefaction of animal substances. This is a valuable manure. The carbonate of ammonia, to obtain it pure from the shops, would be too expensive for a manure. We must make it in our dung heaps.

The nature of manures is just beginning to be understood. The attention paid to it, when science was imperfect, led to few valuable results.—Two new acids were discovered by Berzelius in 1833—the crenic and apocrenic. They were discovered in the Porlar well in Sweden. They are found in all soils. They are among the constituents of peat. They are probably universal. These acids must be neutralized.

The opinions of farmers are often only blind prejudices, though there are bright and honorable exceptions to this remark. Facts which are universally admitted must have a foundation. These acids are found in humus or geine—are found also in our waters—in all soils—sometimes in union with bases—sometimes in a free state. In respect to these scientific investigations, we have as yet only skimmed the surface. More, however, has been effected within the last three years than ever before since the history of man.

Geological and agricultural surveys are creditable to the state. The facts which they collect and embody, may be rendered of the highest service.—A state geologist might be fully occupied in the analysis of soils. Agriculture, thus made the subject of scientific inquiry, would cease to be a drudgery and attain its proper rank among the first employments of man. Agricultural books are many of them full of absurdities, because the nature of the elements of which they treat is so little understood. Many have heard of the experiment of the man who shut up a hen and fed her exclusively upon wheat. It was a matter of insoluble mystery how, under such circumstances, she could obtain lime enough to form the shells of the eggs which she laid, which in truth contained a weight of lime greater than the weight of her body. It was not known that the wheat itself on which she was fed, furnished the lime which she required. Chemistry shows that lime enters into the composition of wheat.

Every farmer has not a taste for science; but some have, and this taste should be cultivated and encouraged. Subjects connected with agriculture are well adapted for country lyceums. Here facts would be obtained from practical and observing minds. The action of manures should particularly invite attention. Experiments in cultivation should be made on soils whose composition is known; and products should be exactly noted and compared with each other.

De Candolle, a distinguished Swiss philosopher, who has given particular attention to vegetable physiology, has treated of the action of poisons upon plants. There are substances which are poi-

* The Dr. here gave another pointed reference to the impure state of the well water of Boston, which was felt like an electric shock in the abdominal muscles of the representatives from the country; (the Boston gentlemen are too far gone in this matter to feel at all,) and made them think at once of resigning their seats or removing the seat of government. There are salts of lime enough in the water of Boston wells drunk every year, to make ten statues as large as Lot's wife! and as to the other impurities which exist in it, according to the Dr.'s account, they are not to be named. No apothecary's mixture surpasses it; and we know of nothing for which it is suited but for whisky or brandy punch!

sonous to plants as there are those which are destructive of animal life. *Nux vomica* and some other substances poisonous to animals, are poisonous to plants. Substances which taken into the stomach of a man may be serviceable to health, if received into his lungs might be fatal. So substances which if applied to the roots of plants might prove destructive, if imbibed in a gaseous form by the leaves, may stimulate and advance their growth. In simple carbonic acid gas, plants would die; but received in quantities larger than exists in our atmosphere, it proves favorable to them. Carbonic acid gas, which in certain quantities is nutritious to plants, is destructive to animal life.

The quantity of vegetable matter in soils and other different substances, presents a curious inquiry. Silix is the same as rock crystal, obtained after solution. Alumine is the same as clay; but clay is not found pure, and usually contains more than fifty per cent. of silix. Oxides of iron, manganese and lime are found. Lime is usually found in the form of a carbonate. Peroxide of iron, iron rust, is found. Silix, alumine, lime and iron, combined in various proportions, constitute soils. Vegetable matter, containing the crenic and apocrenic acids is found. Geine is not a simple proximate principle but contains these two acids. [The Dr. illustrated this matter by an exhibition of the crenate and apocrenate of copper, obtained from geine.]

The analysis of a clay soil in this vicinity is as follows:

Water, - - - - -	2.
Vegetable matter, - - - - -	3.5
Silix and alumine, - - - - -	74.
Carbonate of lime, - - - - -	5.
Oxide of iron, - - - - -	15.
Loss, - - - - -	.5
	100.

Of another is as follows:

Dark clay:	
Water, - - - - -	8.
Vegetable matter, - - - - -	14.
Silix and alumine, - - - - -	72.6
Carbonate of lime, - - - - -	5.4
	100.

To give some idea of the quantity of vegetable matter contained in an acre of ground, we may make the following calculations:

Example of calculation of the weight of a soil and of its manure.

Let the specific gravity of a soil be 1.277—water being 1.—then one cubic foot of water weighing 1000 ounces, a cubic foot of the soil would weigh 1277 ounces or 79.187 lbs.

An acre of land contains 43,560 square feet area, and if we estimate the cubic foot of soil as weighing 79.186 lbs. or half a cubic foot at 39½ lbs. nearly, supposing we wish to calculate the weight of an acre of the soil for the depth of six inches, (the usual depth of tillage,) we have the following sum: $43,560 \times 39\frac{1}{2} = 1,719,620$ lbs., or 859 tons nearly, as the weight of an acre of this soil to the depth of half a foot.

If then the soil contain 9½ per cent. of vegeta-

ble matter, 3.2 per cent. being soluble, and 6.3 insoluble— $859 \times 9\frac{1}{2} \div 100 = 81\frac{1}{2}$ tons of vegetable matter to one acre within 6 inches depth. Of this 27½ tons is soluble, and 54 tons insoluble.

This example is taken from an actual analysis of a soil in the vicinity of Boston. The principles laid down will suffice for the estimation of each and every article found in given soils by chemical researches, and the quantity of manure or of any fertilizer may be easily learned.

Some acres of land upon examination, have been found to contain 91 tons of vegetable matter—some 96 tons—22 of soluble and 72 of insoluble. Excluding stones, we may consider that there are 800 tons of soil to an acre 6 inches deep. In an acre of land, by a calculation of this kind, containing 6.8 of phosphate of lime, bone manure would have no effect.

The peat on the farm of E. Phinney, Esq., used both for fuel and manure, contains 96 per cent. of vegetable matter. The ashes of this peat contains silix, alumine, phosphate of lime, oxide of manganese and oxide of iron.

The carbonate of lime, of potash and of soda, acts upon it. The carbonate of ammonia is taken up by it. Lime neutralizes its acid. Peat bogs are composed of sphagnum mosses; and on Block Island they are said to renew themselves, after being dug over, in forty years, if the surface paring is returned to the pit when they are dug.

Besides decayed mosses, decayed trees and leaves collect in these swamps and compose a part of the deposit. Peat is of immense value, and not well appreciated by farmers. Experiments of its application in a natural state have proved failures. The farmers on Block Island would not use it. A farmer in Waterford, Me. applied it in a crude state, and his corn was dwarfed and appeared as though struck with the yellow fever. When its acid properties are neutralized, it becomes as valuable as horse dung. Peat bogs must be drained. Covered drains properly constructed, are as effectual as open drains. Peat bogs are remarkable for retaining moisture. Wetness is absorbed by the peat by capillary attraction.

Dr. Jackson stated that he had fully described Mr. Phinney's method of management, in his third report on the geology of Maine. His meadows are drained. They are then ploughed or the sward inverted; and then dressed with a compost of animal manure, mud and lime prepared in his hog pens, where the hogs earn much of their living by their labor.

On land thus prepared, he has obtained 75 bushels of corn to the acre, and from 4½ to 5 tons of hay per acre. The last season he got a crop of corn of from 80 to 100 bushels per acre. After such land is well drained, he can work upon it with his cattle. He refuses to sell this peat upon this land even at 500 dollars per acre. Being well supplied with peat mud, each hog will make ten loads of manure in the course of the year. This is then thrown out and freely limed. After three weeks' preparation by lime, this compost may be applied to the land, at the rate of twenty loads to an acre. About one-third of stable manure is deemed the proper proportion to apply to the compost. In the opinion of Mr. Phinney and Mr. Hagerston, three loads of muck and one load of stable dung are equal to four loads of stable manure.

It is a singular fact, that in England peat was formerly considered as a useless substance. One great use of peat consists in its power of absorbing liquid manures. In barn-yards it absorbs the urine. The liquid manure of an animal is considered by many judicious farmers, where it can be well saved and applied, as of equal value as the solid. This subject deserves much attention.

REPORT FROM THE COMMISSIONER OF PATENTS, SHOWING THE OPERATIONS OF HIS OFFICE DURING THE YEAR 1839.

JANUARY 24, 1840.—Referred to the Committee on Patents and the Patent Office, and ordered to be printed.

Patent Office, January 1, 1840.

SIR—The Commissioner of Patents has the honor to transmit his annual report.

Four hundred and twenty-five patents have been issued during 1839, (including eight additional improvements to former patents,) of which classified and alphabetical lists are annexed, marked A and B.

During the same period, three hundred and three patents have been expired, as per list marked C.

The receipts of office for 1839 amount to \$37,260, from which may be deducted \$5,769, paid on applications withdrawn.

The ordinary expenses of the Patent Office the past year, including payments for the library and agricultural statistics, were \$20,799 95, leaving a surplus of \$11,460 43 to be credited to the patent fund, as per statement marked E.

For the restoration of models, records, and drawings, under the act of 3d March, 1837, \$7,973 57 have been expended, as per statement marked F.

The receipts of the office would have been nearly \$2,000 more, had not the late law permitted assignments to be recorded without charge, a gratuity, however, which has given much satisfaction.

In compliance with the act of 3d of March, 1839, I have published a digest of all patents granted by the United States, adding thereto an alphabetical index, and shall deposit in the library of congress nine hundred copies of the same.

The old digest was very defective. A new arrangement has been made, giving to each invention its appropriate classification.

A distribution of the new digest, will materially lessen the correspondence of the office, and guard citizens against the impositions of vendors of spurious patents. The volume contains above seven hundred and fifty pages.

The work was deemed necessary for daily reference in the office, and, believing the appropriation adequate to cover the expenses, I did not delay the publication.

A small additional appropriation from the patent fund will be required to complete payment for the same.

Eleven thousand five hundred and nine patents have been issued by the United States previous to January, 1840.

A large number of applications partially com-

pleted are awaiting the reception of models and treasury fee.

The transmission of models through agents appointed by law in the several states affords much facility to inventors; and if permission were given to deposit with collectors of public revenue the fees required, such accommodations would obviate one cause of perplexity and delay, and be more especially convenient in consequence of their present agency in forwarding such models.

I am happy to say the patent office building is so far completed as to afford, within a few weeks, the necessary accommodation for the office, and to enable the commissioner to receive the numerous specimens of American art as contemplated by the act of reorganization, and to carry out the wishes of congress by collecting and distributing valuable seeds; exhibiting, also, under appropriate classifications, the most important varieties, both exotic and indigenous.

The inquiries propounded by the honorable secretary of state, in taking the next census, rendered it necessary for the commissioner to expend but a small part of the appropriation for procuring agricultural statistics. From data of so high a source, the commissioner can safely predicate future calculations, and hopes to present to congress such details of domestic products as will be of importance in financial estimates.

The diplomatic corps of the United States residing abroad, have been solicited to aid in procuring valuable seeds, and the officers of the navy, with the approbation of the honorable secretary of that department, have been requested to convey to the patent office, for distribution, such seeds as may be offered. In many cases, no charges will be made for seeds. If small expenses do arise, they can be reimbursed by appropriations from the patent fund, daily accumulating, and consecrated specially to the promotion of the arts and sciences.

The cheerfulness with which the diplomatic corps and the officers of the navy have received the request of this office, justify sanguine anticipations from this new undertaking.

With the additional assistance granted last session, and correspondent exertions on the part of those connected with the bureau, the business in each branch is brought up. Less delay will, I trust, arise in future applications.

The number of caveats issued in 1839 was two hundred and twenty-five.

The number of applications for patents the same year exceeds eight hundred. One-half of these have been rejected on examination. That the investigations of the office have not been conducted without care and attention, may perhaps be inferred from the fact that no appeal has been taken from the decision of the commissioner on these cases. These rejections will show patentees, that they are protected from interference, to a great extent, and the public generally, how much they are guarded against useless or invalid patents.

I only add that a small appropriation will be required to continue present periodicals taken at the office, together with some additional standard works which are needed for daily reference.

Very respectfully,

Your obedient servant,

HENRY L. ELLSWORTH.

HON. R. M. JOHNSON,
President of the Senate of the United States.

**LETTERS PATENT GRANTED DURING THE YEAR 1839, FOR INVENTIONS OF MACHINES, &c.,
FOR AGRICULTURAL PURPOSES.**

INVENTIONS OR DISCOVERIES.	PATENTEES.	RESIDENCE.	WHEN ISSUED.
Bee-hives - - - -	Samuel C. Myers -	Mount Pleasant, Pa. -	July 22
Bee-hives - - - -	John Sholl -	New York -	November 29
Bee-hives - - - -	William M. Hall -	Wallingford, Ct. -	December 27
Binding grain - - -	Israel Keyes -	Putney, Vt. -	July 17
Churn - - - -	Milo B. Hough -	Dover, Ohio -	January 21
Churn - - - -	John S. Thomson -	Wyalusing, Pa. -	July 27
Corn sheller - - - -	Alonzo R. Dinsmore -	West Chester, N. H. -	February 28
Corn sheller - - - -	Wm. McIlroy Bartley and Wm. Boon -	Greenwich, N. J. -	March 30
Corn sheller - - - -	William R. Parker -	Milton, Del. -	July 9
Corn sheller - - - -	Lester E. Denison -	Saybrook, Ct. -	August 12
Corn sheller - - - -	Samuel H. Kisinger and E. G. W. Stake -	Williamsport, Md. -	October 31
Corn sheller and hulling grain - - - -	John Mercer -	Harrisville, Ohio -	June 24
Cultivator, corn - - -	John B. Smith -	Norfolk, Va. -	April 15
Cultivator, garden - -	John B. Smith -	Norfolk, Va. -	April 10; antedated Oct. 10, 1838
Cutting, attaching scythes to snaths - - - -	Ebenezer G. Lamson -	Shelburne, Mass. -	July 2
Harrow, revolving - - -	Moses G. Cass -	Utica, N. Y. -	September 10
Hulling clover seeds and other grass seed - -	Abraham Keagy -	Morrison's Cove, Pa. -	June 24
Mowing machines - - -	Asa B. Trask and Davis Aldrich -	Ellington, N. Y. -	October 16
Plough - - - -	William Small -	North Argyle, N. Y. -	April 22
Plough - - - -	Ebenezer G. Whiting -	Racine, Wisconsin, T. -	July 11
Plough - - - -	Ambrose Barnaby -	Ithaca, N. Y. -	September 11
Plough - - - -	Josiah Dutcher -	New York, N. Y. -	October 9
Plough, coupling, &c. -	Joseph Card and Grandi- son Newell -	Mentor, Ohio -	November 9
Plough, hill-side and hori- zontal - - - -	John M. Jordan -	Lexington, Va. -	April 19
Plough, mould-boards of -	Samuel Witherow and Da- vid Pierce -	Philadelphia, Pa. -	October 5
Rake - - - -	Hezekiah Haynes -	Middletown, Vt. -	June 18
Rake, hay and grain harrow	George Davis -	Belmont, Ohio -	July 22
Rake, hay revolving - -	Ephraim B. and Moses D. Wells -	Morgantown, Va. -	September 20
Seeding, planting corn	Niram R. and Orn G. Merchant -	Guildford, N. Y. -	October 12
Seeding, planting corn and other seeds - - - -	David S. Rockwell -	New Canaan, C. -	March 12
Seeding, planting machines	Moses Atwood, jr. -	Hampstead, N. H. -	June 24
Seeding, planting machines	John M. Forest -	Princess Ann C. H., Va. -	June 25
Seeding, sowing grain, plas- ter, &c. - - - -	Samuel Hoffer -	Londonderry Pa. -	July 17
Seeding, sowing seed - -	Martin and Samuel Lee Seward -	Guildford, Ct. -	July 27
Smut machine, &c. - - -	William C. Grimes -	York, Pa. -	March 25
Smut machine - - - -	John B. Yates -	Sperryville, Va. -	October 12
Smut machine - - - -	Leonard Smith -	Plattsburg, N. Y. -	October 18
Smut machine - - - -	Luther B. Walker -	Orangeville, N. Y. -	October 18
Smut machine - - - -	Samuel W. Foster -	Scio, Mich. -	December 21
Smut machine, cleaning grain - - - -	George Mann, jr. -	Lockport, N. Y. -	June 29
Smut machine, cleaning grain - - - -	Thomas McCrea -	Ann Arundel, Va. -	August 9
Smut machine, cleaning wheat - - - -	Elisha W. and William B. Young -	Parkman, Ohio -	July 2
Straw cutter - - - -	Willis Grantham -	Marshall's Ferry, Tenn. -	June 18
Straw cutter - - - -	William A. Staples -	Lynchburg, Va. -	November 16
Straw cutting - - - -	Charles T. Botts -	Richmond, Va. -	March 15
Straw cutting, &c. - - -	Thomas Hopper -	New Brunswick, N. J. -	March 15
Thrashing and cleaning grain - - - -	Matthew McKeever -	Staunton, Va. -	March 15
Thrashing, shelling, and hulling grain - - - -	Thomas Elliott, jr. -	Middletown, Ky. -	March 26
Thrashing machine, teeth for - - - -	Jeremiah Wrightson -	Tobacco Stick, Md. -	May 17
Winnowing machine, fann- ing mills - - - -	Alfred Ervin -	Jefferson, Md. -	September 30
Winnowing, separating wild peas, &c., from grain, re- issue - - - -	Lester Butler -	Cobleskill, N. Y. -	Patented June 3, 1837, and reissued March 8

BEET SUGAR—AGAIN.

From the Journal of Commerce.

Good reader, did you ever see any beet sugar? did you ever taste it? We have; and must say that handsomer or better flavored brown sugar we never met with. The grain is very fine,—finer than is usual even with cane sugar,—while the flavor is like that of maple, free from the least tinge of nausea, and sweeter to the taste than the purest loaf. If such sugar can be produced at the same price as cane or maple, it will have a great run. We conceive that Mr. Child (to whose book we alluded in our former remarks) is rendering an important service to the American public, and we hope to himself also, by bringing the question to a practical test. He manufactured, (so far as we know,) the first beet sugar ever produced in America. For this, he has within a few weeks received a premium of \$100 from the Massachusetts Agricultural Society, it being the same article to which previously a medal was awarded at the great Boston Mechanics' Fair in the autumn. About 300 lbs. were made in 1838, much of which was good, but a still better article was produced the next year. An improvement in the drying apparatus, by which the access of smoke was prevented,—and better acquaintance with the management of it, by which fermentation on the one hand, and carbonization on the other, were avoided, gave a nearly unexceptionable material; the liquor was light colored and transparent; the proportion of lime required, less; the defecations more prompt and complete, and the concentrations almost without acums; in short, the sugar graining in a few hours, drained well, *"and is not inferior in flavor or appearance to the finest West India Muscovadoes."* Mr. C. adds in this connexion, "the quality of the molasses has been a matter of surprise to us. In France, the molasses is considered of no value except for feeding animals, or for distilling; and it sells for 4 or 5 cts. a gallon. The molasses from the sugar in question is of a bright amber color, and so pure and pleasant, as as to be preferred by many to any but sugar-bakers'." Mr. Child considers the following points to be well ascertained by his experience thus far:

1. That all the saccharine contained in the beet can be extracted by the method of desiccation.
2. That the raw sugar can be obtained without any bad taste, and fit for immediate consumption.
3. That American beets, though generally inferior to the European in saccharine richness, can by suitable culture be made inferior to none.
4. That 50 per cent. more of crystallizable sugar can be obtained by the method of desiccation, than has generally been obtained by grating and pressing or macerating the green beet.
5. That the beet, once dried, may be kept an indefinite time without liability to injury.

This method of desiccation, the invention of Schutzenback, is the one practised at Northampton. Mr. C. observes that a method has been patented by Mr. Herd of Stonham, near Boston, of drying the beet by a cold blast; in other words, by freezing it dry. This he calls an ingenious conception, but is not convinced that it can be made available as a method of manufacture. In his own experience Mr. C. has endeavored to carry out the principle

of desiccation, by machinery of his own; Schutzenback having been unwilling, it seems, to impart any information, unless the privilege of using his invention in the whole United States were previously purchased, and security given for the payment, in case the truth of his pretensions should be demonstrated by the result of a model factory. It is proper to add, that some experiments have lately been made on beets dried by steam, and that the result is stated to be a "white sugar, obtained at once, fully equal to the clayed sugars of Havana." Some of our northern friends who have examined the article confirm this statement of Mr. C. The same method will be practised extensively hereafter, we presume—perhaps altogether. We understand that the company for which Mr. C. is engaged have purchased a large establishment in the vicinity of Northampton village, recently set up with a view to the (exploded) silk manufacturing, and that their intention is to make about 300,000 lbs. of sugar the coming season. This will suffice to give Mr. Child's notions and the whole business a tolerably fair trial. At present, though many points are settled, others, by his own showing, (and he is very frank and fair about it,) are not so. The thing may be practicable, for example, without being profitable. This is with us Americans the chief consideration, as it is very apt to be in all similar cases.

In regard to the success of the culture, we are told that in the department of the north, in France, the average produce of an acre is 15 tons (600 lbs.) This is the highest in that country. In the two adjoining departments (Aisne and Pas de Calais), it is 12 and 11. As we recede from old Flanders, the head quarters of the beet sugar industry and of French husbandry, the rate declines to 10 tons. The general average is 13. In Germany the average is 15. At Northampton the best fields have yielded 15, but they were not trimmed closely or the gross weight would have been reduced 10 to 20 per cent.; so that the merchantable produce would have been 13 tons to the acre. It is proper to observe that far larger crops than any here mentioned are often had in France, and they probably show what might be done more generally. Thirty tons an acre, Mr. Child says, are not uncommon, and 45 have been produced. In England they considerably exceed this. He is informed by Mr. Kyan, the inventor of the anti-dry-rot process, and interested in an establishment for the manufacture of paper, brandy, and vinegar from beets, that there the average crop is 30 tons per acre, and the maximum 50; being, at 58 lbs. to the bushel, no less than 1931 bushels; and capable, if as rich as the beets of France, of making 8960 lbs. of brown sugar. It appears that our beets, with slight exceptions, have not attained a degree of saccharine richness equal to that of the French. Instead of 10 to 10½ per cent. of sugar, they have contained but 7½ to 9 per cent. Mr. C. attributes it to the inexperience of cultivators, and mainly to improper measures. This is considered a matter of great importance. Animal ordures do very well, but it is said, the most stimulating and at the same time innocent manures for the beet, are *the refuse of the sugar-house*, acums and sediment from the pans, and animal charcoal, or bone-black in powder, which has been used in clarifying, and which powder is mingled with earth. Mr. C. observes that this article was unknown until 1822. Pre-

viously many millions of pounds had been annually thrown into the public discharges. It had been used for a number of years, as it still is, for clarifying juice, liquor, and syrups, in the manufacture and refining of sugar. In that year *Payen*, a distinguished refiner, at Paris, suggested the idea of its value as manure. Experiments were immediately made, with striking results. At first it sold for about 16 cents a bushel, but soon rose to three times as much. It is now manufactured at a large establishment near Paris, expressly for manure.

On this general subject Mr. Child says, we think pretty truly, that the fertility of our country has been declining ever since its settlement. "We speak of the country at large, and it is no answer to any that there are farms equal or superior to the maiden soil, which our fathers found. Probably a century with the best system of agriculture, and the best disposition to execute it, could scarcely restore an amount of fertility equal to that which has been dissipated. This is not good husbandry, it is barbarous waste. Good husbandry increases or keeps up the fertility of the soil. The truth is that we have generally sought to get from our lands the most that we possibly could, in the shortest possible time. In this, as in other things, haste makes waste. We kill the goose that lays the golden eggs.

In regard to its effect on the soil, it would seem that much may be said for the beet. Mr. C. observes, as to corn and broom-corn, that neither of these is an *enriching* or a *cleaning* crop. The beet is both, exterminating every noxious plant and leaving green stuff on the ground, which ploughed in is equal to a quarter or half manuring, i. e. to 5 or 10 loads of manure per acre, and the expense of carting it. The addition which the beets, worked up in a sugary, make to the stock of manure, is another item of moment, and much stress is laid on the value of the *pulp*, (left after pressure.) This usually contains more saccharine matter in proportion to its weight than the original material. An ox consumes 60 to 75 lbs. of dry pulp per day; a sheep 4 to 5 lbs. A factory working up 25,000 lbs. of beets per day, will feed 70 oxen, or 1000 sheep; or 50 oxen and 300 sheep; or 30 oxen and 600 sheep. Wheat straw is usually given with the pulp, and toward the close of the fattening, oil-cake or meal is added. Three months suffice for fattening a bullock, and two for a sheep. The amount of it is, that a vast quantity of manure is made on a beet-sugar farm. It is usually estimated at *four times the ordinary quantity*; and its quality, being that of sheep, hogs, and horned cattle, is of course excellent.

All these are profits to be considered in calculating the pecuniary practicability of the business among ourselves.

According to Mr. Child, the actual cost of the sugar made by him, when the material was good was 11 cents per pound; the pulp and manure not being taken into the account. Mr. C. thinks that with proper and sufficient means, beet sugar may be manufactured in the United States for *four cents per pound*; and that when the manufacture shall have become domesticated amongst us, it will probably be produced at a cost less than that. In France the great advances made are certainly encouraging. According to the earliest accounts, the pound of raw sugar costs 16 cents. Drapier of Lille, in 1811, made the refined beet sugar at 35

cents, and Dombaole, two or three years afterwards, at 30 cents. Count Chaptal, in 1822, stated the cost of the raw sugar in his factory at 11 cents. In the same year, the Duke of Ragusa made it at 9½ cents, and Crespel at 6½ which, in 1825, he had further reduced to 5½. Two years ago, Crespel in giving evidence before a committee of the Chamber of Deputies, on the beet sugar excise bill, stated the cost of his sugar at five cents, one mill. Mr. Child says he has compared the results of twenty-nine French factories, and found the cost of their sugar 6 cents 6 mills, to which however must be added, he observes, the green leaves for feeding a large stock of cattle and sheep two or three months or the same leaves left on the field and ploughed in; the manure, which is quadrupled in quantity and improved in quality on a farm where a mill is erected; the value and abundance of other crops, in consequence of the clearing and pulverising of the soil; and the trimmings of the beets, which Chaptal considers to be in 12,000 lbs. sufficient food for 25 or 30 swine. We subjoin for the benefit of the interested and curious, the following *estimate* for a factory in the United States on either of the ordinary French systems, to make 300,000 lbs. in six months, from the first of August to the first of February.

Expenses.

3000 tons beets, raised on the farm at \$2 exclusive of rent	\$6,000 00
Labor in the factory, 10,524 days' work, at 75 cents	7,893 00
Fuel, 500 cords, at \$2	1,000 00
40,000 lbs. bones for manufacturing animal black, at half a cent	200 00
Lime, acid, &c.	100 00
Lighting, insurance, taxes, and repairs	600 00
Superintendence and book-keeping	2,000 00
Interest on capital invested in land, buildings, machinery, and utensils	2,000 00
Interest on floating capital	1,067 58
Contingencies	1,000 00
Total	\$21,860 58

Products.

300,000 lbs. sugar at 6 cents	18,000 00
Pulp and molasses, consumed on premises	5,000 00
Total	\$23,000 00
Deduct expenses	21,860 58
Remain net profits	\$1,139 42

Deducting from the expenses the value of the pulp and the molasses, we have \$16,859 58, which, divided by 300,000 gives 5, 2, 3 cents the pound. The pulp would be upwards of 10,000 lbs. per day, sufficient to feed 100 bullocks, and 600 sheep; and the trimmings and remnant of pulp, 100 swine. Labor is much dearer than in France, but Mr. Child thinks this would be balanced by rent and fuel. This applies to large factories. There is another question as to the small household manufacture. Here Mr. C. is not so sanguine, as it requires skill and science to make it profitable, more than most common farmers have or will get. He says, too, there is no efficient apparatus, which is simple and cheap enough. Still he believes the

time will come when sugar mills will be set up by the more forehanded, as cider mills now are; and sugar beets, which may be produced by those who cannot afford to build a mill, will be carried to their neighbors, and worked up on shares as cider is made among us, and as wine is made in the French communes. In the east, he observes, there are itinerant sugar makers, who are provided with a moveable apparatus which they establish under a bamboo shed in a given neighborhood, and work up the canes as the cultivators bring them in. Mr. Nosarewski suggests this as a practical mode of domesticating the beet sugar manufacture in Poland, in connexion with his system of drying the beet. Details are given, to show that raising the beet, simply, would hardly fail to be profitable here. In this case, the climate comes to be considered. There has been a common belief abroad, that a northern climate alone would do, and that 45° was the true boundary. This is considered a mistake, (derived from the fact, that many of the establishments, and especially the early ones of the south of France, miscarried from other causes,) as in the first place all plants are found richer in oleaginous, aromatic, and saccharine properties, the farther we go towards the equator; and in the second place, that the beet does not depart from this law, we know by experiments on samples raised in the extreme south. Humboldt found that the same law applied to different altitudes, on the table lands of Mexico. In 1836, eight factories then in the department of Vaucluse and in Languedoc, made 1,131,000 pounds of sugar. These are all situated south of 45° . The business has been introduced into the kingdom of Naples, where one of the principal advantages expected, is the production of two crops a year, and the supplying of fresh material from the field, all, or nearly all the year round. Mr. C. is not yet informed of the result of this enterprise, nor of a similar one undertaken in one of the West India islands, where beet and cane have been placed side by side for a fair race. This last, will be awaited with no small interest. It appears that beets ripen earlier in the United States than in France, the summer heat being more intense.

At Northampton, beets sown the first of June the last year, were perfectly ripe on the first of September, whereas the period of growth and maturity is never estimated in France at less than four months. This will enable our manufacturer to begin his operations a month earlier than in France, and of course to have seven months for working up the green beet in lieu of six; besides which, he will not be obliged to lay up so large a proportion of this material in pits. As to soil, the beet seems by no means very particular. Whatever will do for indian corn, will do for that.

As all that concerns the beet now is a matter of great interest, we should notice Mr. Child's remark, that the common wild sea-beet, is thought by many to be the parent of all our numerous species. This grows in Holland and Great Britain on the salt marshes, and is found about Nottingham in England. The first beet planted in France, was however, a native of the southern and maritime regions of Europe, and was brought from Italy. The Romans were acquainted with the white beet. The uses made of this vegetable are worthy of notice. Besides furnishing sugar,

it is also used for making coffee, beer, brandy, spirits of wine, potash and paper. There are establishments, on the continent and in England, where these respective products are obtained in abundance. Mr. Child mentions also, without contradicting it, the late rumor that they are making wine of the beet in France. And yet even the beet, it would seem, may be supplanted, for we are told "other plants usually grown in our soil are capable of furnishing sugar, and that some of them may be found worth cultivating for that and accessory products. We have tried Indian corn-stalks and the pumpkin, and have obtained from them good sugar and molasses. Perhaps those crops may alternate advantageously with the beet. If the manufacture of sugar from the stalks of Indian corn can be reconciled, as we believe it may, with the maturity or near maturity of the ears, this source of saccharine may supersede the beet root. The seeds of the pumpkin yield a fine sweet oil, but we have no means of judging what quantity of this product can be obtained from a given extent of land. If it should turn out satisfactorily in this respect, the pumpkin may one day overshadow the sugar cane.

We have spoken of the Northampton experiments as the only ones of note in this country, and they are so. Yet others we hear have been made to such an extent as to encourage an attempt in Burlington, New Jersey. An establishment is about being raised, to operate on the method of Sorel and Gautier, which has lately made some noise. It seems they grate the beet with a hand grater and deprive the pulp of its saccharine by an instrument they call the *Extractor*, which they declare completely exhausts it, and gives a purer liquor than either pression or maceration, properly so called. A complete apparatus of Sorel and Gautier capable of working up 600,000 pounds, is stated to cost \$1254; the rated expenses of operating to that extent \$1881, and by the grater and presses \$2337; the amount of product 42,000 pounds, instead of 30,000 pounds as by the common systems; and the cost of the sugar will be only 2½ cents per pound. As to this, "*We shall see.*"

One word by way of caution. We advise no body to make a hobby of the sugar beet. For speculation purposes, it is no touch to the morus multicaulis: and that humbug is pretty much used up. If any money is to be made out of beet sugar culture, it will only be by hard work, and perseverance, probably amidst many discouragements. We would not recommend that every body should go into it at once. Let Mr. Child and a few others make the experiment first. If it succeeds, others can follow them. If it does not, they can save their money and their patience. It is however a branch of industry which *may* become extremely important in this country. The value of sugar imported into the United States from foreign countries, is about \$7,000,000 per annum. If we can grow all this sugar at home, or a part of it, at cheaper rates than we can import it, we had better do so.

P. S. Since writing the above, we find it stated that application has been made to the legislature for the incorporation of a company in this city, with a capital of \$500,000, "for the purpose of manufacturing sugar from beets, and refining sugar."

ISABELLA GRAPE VINES—WINE, &C.

From the Cultivator.

The cultivation of grape vines and making of wine is getting to be so well understood throughout the United States, through the medium of our excellent agricultural periodicals, that what I am about to write, is probably already known to some of your readers; yet the repetition of interesting facts is often of much benefit, and the results of experience in these matters can scarcely be too often repeated.

The very numerous attempts to raise grapes from foreign vines in the *open air*, have resulted in disappointment. The late Mr. Parmenter, of Brooklyn, Long-Island, devoted much labor and expense on foreign vines, to very little purpose. Mr. Loubat, also near Brooklyn, planted a large vineyard, and for some years flattered himself with *hopes* which resulted in loss or disappointment. In some few instances in Brooklyn and New York, where the vines were protected by surrounding buildings, the Chesselas and other foreign varieties yielded well, thereby only demonstrating that such fruit *can* be obtained if cultivators will be at the trouble of erecting proper houses for the purpose.

The Isabella grape vine is supposed to be a native of North Carolina. It first obtained its well deserved notoriety at Brooklyn, in the garden of Geo. Gibbs, Esq. now of St. Augustine, Florida; and derived its new name from his lady, Mrs. Isabella Gibbs, who was instrumental in obtaining it from the south for her garden. The original parent of all the Isabella vines is now to be seen in the garden of Zachariah Lewis, Esq. on Brooklyn heights. This favorite vine has spread itself throughout the northern states of the union, in Canada, and has been imported into France, and drawn forth the favorable notice of the French cultivators. Almost every garden and doorway in Brooklyn and New York can boast of its prolific vine, always yielding abundance to the careful cultivator.

In the year 1827, I set out, at a small place near Brooklyn, the cuttings for about 300 Isabella vines, and fifty foreign vines from France and Germany. By reason of careless cultivation from bad tenants, they did not come into bearing until 1831, in which year I was able to exhibit five kinds of very fine grapes at the horticultural exhibition in New York. I also sent large quantities to the market, and made about fifty gallons of wine, merely as an experiment, as I supposed myself to be the first who had attempted to make wine of this grape. This wine was of two kinds, made in October, 1831, and in April following was put into bottles, and one bottle of each kind sent to about fifty persons in different parts, who were supposed to feel an interest in the matter. One kind was made of pure juice, to which two pounds of sugar to each gallon was added. The other kind was composed of one-third water to two-thirds juice—three pounds of sugar to each gallon—one gallon of brandy to a cask of nineteen gallons. Some of this wine attained five years, and was pronounced very excellent.

In the year 1832, my little vineyard bore very abundantly, and I made, in October of that year, eight barrels of wine. It was made in a variety of modes, to test the quality of the grape, and did

not all prove good; but far the greater part was very excellent and improved with age.

I will now proceed to describe my mode of planting and cultivating the vine, and of making wine.

The cuttings intended for propagation are of any well ripened wood of the *last year's* growth, embracing three or more joints or buds. It is preferred that it should be connected at the lower joint with some small part of the old wood of the previous year. These cuttings are taken from the parent vine at any time between the first of November and first of March and immediately buried in the earth, or put under earth in the cellar, or sometimes the ends are put in a box or basket with earth, and set in a green house, and water occasionally sprinkled on them. In the spring, if they are not placed in their permanent locations, they may be carefully set out in the garden, at one foot apart every way, the upper bud being just even with the surface of the earth. If the season is dry, they will require to be watered several times to insure their growth. They will grow a foot or more in length the first season. In the following spring they may be transplanted to their permanent places, around buildings, fences, trees, and arbors. I trim the new sprouts down to three or four buds, intending that *two only* shall be allowed to grow, and those to be trained off from the root in different directions, according to the circumstances of your trellis, or supporter. My vineyard was planted in rows, eight feet apart, and vines eight feet in the rows; but after a few years the trellis became so burdened, that I took up and removed one-half the vines, and left them sixteen feet apart in the rows. Each vine, therefore, had sixteen feet of trellis, being eight feet on each side of the root. The two main branches were tied to the lower part of the trellis, and the lateral branches tied to the rails above.

My trellis was composed of four laths, open at the top, as I supposed it was necessary that the sun and air should have a good circulation among the vines; but I am now convinced that a top surface, as afforded by an arbor, is necessary. The great exuberance of the vine causes the new shoots to run up into the air above the trellis, and the wind will prostrate and break them, unless they have a flat arbor to rest upon. The fruit hangs with great weight on the branches, which are often broken unless they can rest on an arbor, or are well tied to the upright supporters.

As there are *four* distinct *prunings*, or trimmings, required in properly cultivating the Isabella vine, I will now describe them; merely remarking, that although the vine will give fruit when some of these trimmings are neglected, yet no cultivator has a right to expect *good fruit* without bestowing the requisite time and attention to their prunings.

First the winter pruning. This is best done in February or March, provided the vines are not frozen; but may be done at any time between October and April. It consists in reducing the old wood according to the extent of your trellis, and the age of the vine, and strength of the root. All unripe wood is cleared off—old wood thinned out, and ripe wood of the *last year's* growth shortened down to two or three buds, *except* such runners as shall be selected to cover the trellis. Much depends on judgment in this trimming. It is diffi-

cult to describe the precise rules. Those who love the grape should *cut boldly*, and acquire knowledge by experience and close observation. Every branch should at this pruning be strongly tied to the trellis.

The second pruning; or building, takes place about the 10th of May. The buds have then thrown out their branches an inch or two, and generally two or three branches at every bud, or joint. These must all be reduced to one shoot, or branch, always leaving the stoutest or best shoot. They are disengaged with a slight touch, and a short time would suffice for many vines.

The third pruning takes place about the middle of June, and sometimes earlier, and is best performed with a pair of shears, or scissers. At this time I cut off what were called *laterals*—a branch growing out of the green wood on the side opposite to the fruit. These laterals may be broken or cut off quite down to the main branch at any time during the season; but it is better to remove them early before they have acquired size and at the expense of the rest of the vine.

The fourth and last pruning is called *stopping*, or *shortening*, and is done with a shears or a knife. It should be done about the middle of July, when the fruit has attained about half its growth. I then shorten all the branches having fruit on them, (except those retained for permanent runners,) by cutting them at two or three joints forward of the fruit. This is a heavy and essential pruning, and divests the vine of much green wood and leaves, and is considered important to the development and ripening of the fruit. I would, however, particularly caution the operator against at any time removing the *leaves* of the vine, except such as are attached to the laterals and shortenings, and come away with them. The leaves are vitally important to the ripening of the fruit, which is always the best in the deepest shade. Such fruit as by accident becomes exposed to the sun, is sure to be very inferior and sour.

About the 8th of June, while the vine is in flower, and throwing its peculiar and delicious perfume all around, its greatest enemy, the *rose bug*, makes its appearance, and feeds with voracity on the sweet and delicate blossom. In a few days after their first appearance, thousands are seen, carrying destruction throughout the vineyard. The best remedy I could ever devise, is to go among the vines early in the morning, before the sun has warmed them into activity, and they are then easily made to fall into the hand or on the ground, and may be crushed and destroyed. A few mornings spent in this way will clear the vineyard, as they are a short-lived enemy.

In the latter part of July, the *blight* or *rot* takes place where the *Isabella* vines are cultivated in fields, but it is seldom seen among those cultivated in cities. Great quantities of fruit will become brown, and sometimes black, and fall off. It is not easy to account for this destruction, which is seen as much on the high as on the low vines, and no less on fruit exposed to the sun, than on that in the shade. As an experiment, I discharged with a syringe, lime-water, sulphur-water, and soap-suds upon them, and also sifted dry sulphur on the fruit, but without any sensible effect. I feared I should lose all my grapes, but to my surprise, I had a great crop, notwithstanding the rot.

I have since supposed it may arise from exuberance of the vine, which, like the peach and apple tree, may perhaps thus disburden itself of a portion of its fruit; but even on this principle it is difficult to account for its non-appearance in cities, where the quantities of pure fruit are quite astonishing.

I have observed in the cities, that spiders and caterpillars are in some degree destructive to the green fruit. Spiders will get to the centre of the cluster and cause the fruit to fall in single grapes, but the caterpillar attacks the *stem*, and the whole green cluster falls to the ground.

I have in a few instances trained the vines upon large apple trees; but I do not think this mode is to be recommended where other supports can be had. The fruit was inferior.

In the city of Brooklyn, and among high buildings, my vines have not failed to produce abundantly every season, during the last fourteen years. This is an interesting fact to all who cultivate the grape. At my vineyard in the country, they have declined very much, which I attribute to the neglect and ignorance of the tenants on the place. Even in the country they are much better around the buildings than in the open air. There are from three to five clusters on every fruit-bearing branch. I have in a few instances seen six. The extremities of the vine generally produce the best fruit, and there is often much difference in the quality of the fruit on the same vine. They may be trained a great distance over large arbors, and on the roofs and around the upper windows of our high houses. New branches will sometimes grow from twenty to thirty feet in one season.

The vine is sometimes propagated by *layers*, which consists in bending down the branch into a channel dug in the earth, and burying it at proper depth, in a curving line, with the end above the earth. Roots will start plentifully from the part in the earth, and when it is well rooted may be cut from the parent vine and transplanted. If proper care is taken, the cuttings as well as the roots may be sent a great distance. I sent a quantity of cuttings, packed in moist sods in a box, via New Orleans to Arkansas, and had the satisfaction to learn they were all alive on their arrival, and had been successfully planted out.

Nothing is lost in a vineyard, as the green trimmings in summer are good for cattle, and winter trimmings, when not required for propagation, make good fuel.

Of Wine.

Although I was successful in making some good wine, yet a portion was spoiled, and I do not flatter myself that I know much about it. An excellent little book, published by Mr. Adlum, of Georgetown, who was a great cultivator of grapes and manufacturer of wine, was my best guide in wine-making. I would respectfully advise such as wish information on this subject, to obtain it, and follow the rules there laid down. My experience, however, may be of some service, and I cheerfully give it.

The grapes were gathered and thrown into tubs, without breaking the clusters, or separating the ripe from the unripe. The were broken by a common pounder, and merely cracking the skin is sufficient, and care should be taken that the

seeds be not broken. The *murk* or *pomace* is thrown into a *vaz*, which is covered with one or more blankets, to confine the heat and hasten fermentation. A portion is sometimes warmed and added to the mass, to give it a start. The pomace rises on the top, and the whole will continue to rise and ferment upwards for four or five days. When it begins to sink, the fine liquor, as clear as oil, may be drawn by a tap from near the bottom of the vat, as long as it will run clear. This makes the *best wine*. The pomace is then pressed in any convenient mode, and all the juice extracted. The liquor is then called *must*, and in this state it is when any addition may be made, such as sugar or brandy. Nothing will incorporate well unless added before fermentation. I added in different casks from one to three pounds of sugar per gallon, but I would advise the adding of the three pounds per gallon in all cases, and I am not certain that a less quantity will preserve the wine from running into the acetous fermentation. If properly made the wine does not require brandy, nor any other spirit, and is much better without it.

After the sugar is added in due proportion to the must, it is put into casks in a moderately cool place, and just filled to the open bung, and allowed while fermenting to overflow. It will work briskly for a month or more, and when it sinks in the cask, must be filled up, so as to continue to overflow. It is best to *stop the fermentation* before it quite subsides, in order to preserve the fine aroma of the wine; and this is done by repeated *rackings*, or drawing off into casks previously smoked with sulphur, by burning in them rags dipped in melted brimstone. If any particular flavor is desired to be communicated *artificially*, it must be done while the must is in early stages of fermentation. It will probably continue to ferment after this first sulphuring and racking; and it may then be fined, or clarified. Many substances may be employed in this. Whites of eggs—milk and sand—fish-glue, sometimes called *isinglass*, may be stirred into the wine, which may be racked off in a week or ten days afterwards. At every racking a quantity of sediment is removed from the bottom of the casks, and these rackings and finings must be continued until the wine is perfectly pure. I commenced my wine making in October, and considered it fit for bottling in the March following, when it was put into bottles, demijohns, and tight casks.

Even when *new*, the wine is exceedingly good and palatable, and diffuses an inward glow, grateful, cheering and healthful. The taste and aroma are different from any wine that I have ever known, and I cannot compare it with any.

I ascertained that a measured bushel of grapes, as they came from the vines in clusters, weighed thirty-eight pounds. I also weighed one hundred pounds of grapes and crushed them, and obtained a little more than nineteen gallons of juice; it thus requires eleven or twelve pounds of grapes for each gallon of wine.

The location of my vineyard being considered unhealthy, I have given it no personal attention since 1832, but many persons in and about Brooklyn have made good wine from the Isabella grape since that time; and I do not doubt that others will follow their example, until the Isabella wine shall become a favorite at the tables of our best connoisseurs.

There is much to be learned concerning the cultivation of the vine, and I look to the correspondents of your excellent agricultural journals, for information on this as well as other branches of these interesting pursuits. In this town last season the Isabella grapes did not come to perfection, and were sour and worthless; yet I had excellent grapes from the fine vineyard of my friend, Josiah Dow, Esq., of Brooklyn, which is twenty miles west of this place. I should like to know whether manuring is desirable? what kinds, and to what extent? what protection is best? and whether my mode of trimming is, or is not, well adapted to perpetuate the vine?

In conclusion, I would remark, that the Isabella grapes are *eatable*, and often in the market long before they are *ripe*; and consequently many people are ignorant of their excellence when in *perfection*. I give it the preference to any grape I have ever tasted, and the vine is the greatest bearer I have ever known.

ALDEN SPOONER,

Hempstead, Long-Island, Feb. 15, 1838.

From the Southern Cabinet.

NOTES ON EUROPEAN AGRICULTURE. BY A CHARLESTONIAN.

NO. II.

I stated in a former number that, in my opinion, England was in a higher state of cultivation than any other country in Europe. This is in part owing to the industry of its inhabitants—to the intelligence of those under whose direction the lands are cultivated—and not a little to the climate itself. The persons connected with agriculture in England may be divided into three classes. First—the owners of the soil. These are, in the majority of instances, composed of the wealthy nobility. The property is usually entailed, and the laws of primogeniture assign it to the eldest son. He seldom cultivates his lands, but hires them out in large tracts to the second class—the farmer. This individual leases the land, commonly for a term of nineteen years. He is usually well-educated and intelligent, and is able to introduce those improvements in agriculture which the lights of science, and the experience of others encourage him to adopt. The manual labor is performed by a third class—the peasantry. These are usually poor and ignorant, and have scarcely any hope of rising beyond the condition of serfs. They are the cultivators of the soil from generation to generation, and the sons and daughters in nearly all instances, follow the condition of their parents. This is the class which, above all others, is most benefited by a removal to America. In England provisions are high, and the price of labor cheap; in America, it is, in general, the reverse. Here, the industrious husbandman is soon rescued from a state of dependence and poverty. Lands in our new settlements can be purchased at a less cost than the taxes would amount to in England. Hence the difficulty of obtaining laborers on our American farms will, for a long time, present a serious obstacle to our improvements in agriculture. Man every where struggles for independence, and he will not labor for others when he has

so fair a prospect of becoming the owner of a farm. But the strange and wayward climate of England, unpleasant and uncomfortable, as it may be in many respects, may give us a clue to the secret of its fertility. With the latitude of Labrador, its winters are less severe than those of Maryland. Surrounded on all sides by contending oceans and currents, it partakes of their variable climate—it is a land possessing the atmosphere of the sea. The gull and the tern fly over it as if it were a part of their possessions, and the Solan goose and other sea-birds not only nestle among the beetling rocks, but their notes are heard in every part of the island. Within three days' sail of England, the fogs and drizzling rains commenced. My journal tells me there was but one day out of forty in which it did not rain during some portion of the day. I heard no thunder, nor did the rain fall in torrents as with us, but light showers were continually sprinkling the earth like heavy dews—then the sun would shine for half an hour, throwing its rays in fitful streams through the passing clouds, giving slight indications of fair weather, which soon ended in disappointment. There is no calculating on a dry day in England. An umbrella is almost as necessary an appendage to an Englishman as a hat. It is no wonder that he is enraptured with the bright clear sky of Italy, for he was born among fogs, and has all his lifetime been looking through a haze. He judges by contrast. Others have told the tale of the azure skies and balmy air of Rome and Venice, and his imagination has been fired by the theme; hence he conceives no sun so bright, no air so soft. Had Carolina been as accessible, and could he as easily have made the contrast, he would, if not blinded by prejudice, have admitted that no Italian sky exceeded that of our own southern land. Men may boast of having climbed the Alps to see the sun rise from the mountain of Riga, or set in the Adriatic, yet I am either so prejudiced or old fashioned as to believe that the poet or the painter may go to the ends of the world and find no fairer sky for the embellishment of a picture than that presented during summer, along our Southern Atlantic coast. But to return to the foggy climate of England. It has appeared to me that these incessant slight showers in a high northern latitude, (where the nights are so short, and the continuance of twilight so long, that I find it noted in my journal that I was reading by daylight at half past ten in the evening, and resumed my book at half past two—leaving but four hours of night)—contribute, in a considerable degree, to the abundant productions of the soil. The sun, during the long days of summer, imparts sufficient warmth to the nourishment of the plants, and these are continually kept fresh and green by nature's watering pot. It is true, the early part of the summer of my visit (1838), was characterised as rainy in every part of Europe, still it was not regarded in England as a very striking exception to their ordinary seasons. To the fogs and drizzling rains together with the absence of too bright a light, I ascribed that rich dark green of the fields which I have never witnessed in any other country—the scent of the flowers was, for the same reason, stronger and longer retained—the groves were full of melody—the goldfinch and the thrush seemed to sing sweeter after every passing shower, and the skylark carolled high in the air, in spite of the drizzling mist.

But, in addition to a favorable climate, the soil of England has the benefit of a judicious tillage. I was particularly struck with the system, almost universally adopted in regard to the rotation of crops. It should be remarked that they never cultivate two successive crops of grain on the same field. Although physiologists have not been able fully to account for the fact, that the successive cultivation of grain or vegetables exhausts the soil whilst a change to different product does not impoverish the land to any considerable extent, yet it is now universally admitted, by all good husbandmen, that this is the case. Some have ascribed this to the exhaustion of the proper food of the plant in consequence of its cultivation during successive years, whilst Decandolle, Macaire and others have accounted for it on the doctrine that plants exude from their roots certain substances poisonous to plants of the same variety, which in time renders the earth unfit for their cultivation. (See January number of the Southern Cabinet, p. 17.) As *toujours perdrix* cloyed on the appetite of the Frenchman, so the teeming earth longs for a change of food, and withholds her fruitfulness unless she be indulged. It has often been inquired why is it that a forest which has long been covered with a growth of pine, when cut down does not spring up again in pine, but in oak, gum, and hickory, and *vice versa*. The facts, in a majority of instances, are so. All plants spring from seed—there can be no spontaneous production. *Omnia ab ova* is a doctrine as old as the days of Linnæus, and nature has never departed from it. May it not then be that nature, after having for ages nourished one kind of tree, has exhausted the properties of the soil adapted to that kind of production, and when a new forest is to be created, imparts its influence to trees of a different kind, better suited to its present state, and withholding its fertility from that to which it is no longer adapted. Be this as it may, the English farmer acts on the principle of the necessity of a rotation of crops. The result from this and other judicious modes of culture has been an increase of three fold. In Carolina, we have adopted the opposite course. Many fields have been planted in Indian corn since the days of the revolution, and the result has been that we have retrograded from forty bushels per acre to eight, and often less.

I will now give the method of English culture in regard to the

Rotation of crops.

1st year. Fallow crop. Irish potatoes—beans or turnips. The potatoes, as is the case in high northern latitudes, produce small stalks, and are consequently planted much nearer in the rows than with us. Endless varieties have been produced from seed.

The beans, adapted to field culture, are the kinds usually called horse bean (*Faba vulgaris*.) Hundreds of acres are cultivated with this bean, and its numerous varieties, and the product is immense. It is used as food for cattle. I have never known it to thrive equally well in any part of America, probably owing to our warm summers. In our southern states especially, the pods in general do not fill well, and I doubt whether it is calculated to be a productive crop. There is, however, one variety from the south of France, called the winter bean, (*La Féverole d'hiver*,) which is remark-

ably hardy and prolific. It is planted late in autumn, and stands the winters of France and England, and might be experimented on, as a winter crop, when nothing else can be cultivated with us, and it would not interfere with the crop of the following spring. The Heliogoland bean—purple field bean—and Alexandrian field bean, are also varieties which the agriculturists of England and France recommended to me as probably well adapted to winter culture in our southern climate.

The turnip crop is considered as the most valuable in England for feeding cattle. These different productions, however, require to be noticed under separate heads. I will endeavor to return to the subject in a future number.

2nd year. Wheat—the varieties are yearly increasing. At present, the kinds cultivated almost universally in the higher grounds and lighter soils of Scotland, are the golden drop and blood red. The skins are thicker than in most other varieties and they yield more bran. These varieties would, I think, answer well on our elevated mountainous regions. The average crop is said to be about fifty bushels to the acre. In the Lothians—the Carse of Sterling, and in the low rich soils of England—in Denmark—and the alluvial soils of Germany, I remarked that the varieties called Uxbridge and Hunter's wheat, were most cultivated, and considered most productive. The yield is from fifty to sixty bushels per English acre—the average weight per bushel is from 62 to 63 lbs.—the finest, 65 lbs. The Mengoswell's wheat is a variety of Hunter's and is cultivated on the Carse of Gowrie as a superior grain. Three new varieties have been very recently introduced. The Whittington wheat from the south of England—the Chevalier wheat from France—and the Hicklings—the latter is white in straw, but yellow in sample. Rye is not cultivated. Grass seeds are sown in the fields of wheat in the month of April. These are red clover (*Trifolium pratense*) and rye grass (*Lolium perenne* and *Italicum*.) Calves and sheep are allowed, in autumn and winter, to feed on the young grass.

3d year. This is a grass crop—usually a heavy one. It is sometimes cut twice, but usually only once a year, and serves as pasturage in the fall.

4th year—A crop of barley or oats is now raised. This is once more succeeded by a fallow crop. In this manner crops succeed each other by fours in good lands, or where the soil is inferior, another year is added for grass and pasturage—affording a wheat crop only once in four or five years, but producing in the mean time, other articles equally valuable to the farmer.

(To be continued.)

VALUE OF BIRDS.

From the Farmer's Monthly Visitor.

Mr. Hill,—I was much pleased, that in your first volume of the Visitor, you took so much interest in the preservation of the small birds. Without their aid in destroying the innumerable insects that prey upon the products of the farmer, agriculture in a few years would have to be abandoned. The rapidity with which many kinds of insects are produced is almost beyond conception, and were it not for the check put to it by insectivorous birds, it

would be in vain to sow or cultivate the soil. And many think it doubtful policy, in giving a bounty for the destruction of crows and foxes.

The crow, it is true, sometimes plucks up the newly planted corn; but where he pulls up one blade of corn, he probably pulls up a hundred of the large white worm. So of the fox, he carries off a few lambs, and sometimes a stray goose, but his principal food in the summer season is the large white worm, beetle, bugs, mice, moles, &c., which probably more than compensate for the few lambs they take.

Could the exact amount of damage done by insects to the various crops of grass, grains and fruits, in a single county, for one year, be ascertained, it would be astonishing. Two years ago last season many fields that produced a good crop of hay the year before were almost barren: scarcely a blade of grass was left on many square rods, and the roots were so completely cut an inch or two beneath the surface, by the large white worm, that the turf might be rolled up like a carpet.

Sometimes whole fields of corn are nearly destroyed by the grub, or the wire worm: orchards are defoliated by the canker worm or caterpillar; and fields of most promising wheat are destroyed by the wheat fly or weevil.

The natural history of the various kinds of injurious insects is not sufficiently studied. No doubt nearly every kind might have its life or history traced through all its various changes, habits, food, &c., and probably ways and means discovered to greatly lessen their numbers and check their ravages.

In a late number of the New England Farmer the editor says, "We as yet know of but one effectual remedy against the canker worm—that is, the encouragement of the birds. In our code of penal justice, killing a small bird should be placed next to killing a child. We were assured the last summer, that at the beautifully cultivated district in the south part of West Cambridge, abounding in fruit, they were entirely free from canker worms, while in Old Cambridge the orchards suffered severely. The great security which they found was in the encouragement and preservation of the birds. A gunner in West Cambridge would be in as much danger as an abolitionist in South Carolina."

February 12, 1840.

L. B.

EFFECTS OF EMANCIPATION IN JAMAICA.

An intelligent resident in Jamaica, recently informed us that the results of the emancipation bill ultimately would be, the expulsion or retirement of all the white population of the island, already so disproportioned to that of the colored classes; and that, at no great distance from the present time, it would come to be a St. Domingo. Had the emancipation or apprenticeship system been left to the white colonists themselves, or had their disparity in numbers with the colored population not been so great, no doubt is entertained that the legislation of the British parliament at London would have been nullified in Jamaica; but, as the case stood, acquiescence was only the necessary act that could fall with quieting effect on crushed rebellion. No new demonstrations in favor of equality between the colored and white population have

been afforded by the emancipation bill: since those on the part of the persons of color, who attain any conventional distinction among the whites of the island, stand aloof from those having the hue of themselves, and consort with the whites as instruments, merely, and proud of that distinction. Colored magistrates sit with white ones on the bench judicial, though their expoundings and explanations are doubtless much guided by the latter. Real estate has not been materially affected by the bill in question: but the likelihood of no indefinite continuance of the whites on the island in after times, would seem to make it more an object with them, to dispose of it briskly to those of means and influence among the citizens of color who may thus finally acquire by purchase, or conduct with honorable agency, all the interests of the whites now on the island, who may receive the benefits of their property on *absenteeism* principles, after they shall have left it alone in its glory, until fully paid.—*Philad. Gaz. (Whig.)*

CHEAP STEAMER FOR ROOTS.

From the Cultivator.

The best and cheapest apparatus for steaming roots, &c. we have yet seen, is made, by putting to a box of the required dimensions for cooking or steaming, a bottom of sheet iron, and setting this box on an arch of brick or stone work, allowing about four inches of each side of the box to rest on the brick work. Let the box be made of inch and a half or two inch plank; the sheet iron with a double row of holes for nails, secured to the bottom of this, will be water tight, and a false bottom made of a board, and perforated with numerous holes, with cleats nailed on it to lie on the iron bottom, and prevent the roots burning on it, completes the steamer. We have used one made on this principle, for several years, and know of no plan which will cook food with equal rapidity and cheapness. Our steamer holds 15 bushels, and the fuel required is but a trifle.

METHOD OF PRESERVING CELERY THROUGH THE WINTER FOR FAMILY USE.

From the Magazine of Horticulture.

As a completion of my article on celery, published in your January number,* I send you my method of preserving it for use through the winter. Celery must be taken up in the autumn, before it has been, in the least possible way, injured by frost; as I am confident that, if the tops are frozen, it affects, directly or indirectly, the whole root.

A fine dry day, of course, must be chosen for the above mentioned purpose. When the celery is all taken up, cut off all the fibrous roots and all the green tops, and lay it singly on boards, in an airy shed, to dry, two or three days; turning the whole over once or twice a day will be necessary, in order that every part may be as free from moisture as possible; if this part of the process has been duly attended to, after the third day the celery

will be in good order for the next and last operation, which is as follows:—

Having plenty of dry sand at hand, place about three inches, in depth, of the same, at the bottom of a flour barrel, or any other kind of barrel will answer, provided it is clean and dry; then lay the celery flat on the sand, and so continue on, with the sand and celery alternately, until you finish at the top with sand, about four inches of which should be placed over the last layer of celery, and the work is completed. A dry, cool place, where it never freezes, is to be preferred to keep it in. The operator need not be in the least alarmed, if he finds that it has shrunk a little from the operation of drying; for it will immediately become plump again after packing. He should have faith in the method, and he will be sure to succeed.

J. W. RUSSELL.

Mount Auburn, Cambridge, Feb. 1840.

The above method of keeping celery, by Mr. Russell, is probably as new to most of our readers as it is to ourselves; but we doubt not it will succeed: indeed we have never found much trouble in keeping celery, provided it was not ruined by repeated freezing and thawing of the foliage and stems, before it was dug up in the autumn. This part of Mr. Russell's remarks should be kept in view, as without strict attention to this, the object will not be accomplished.

Mr. Russell's remarks, we apprehend, apply only to preserving celery for family use during the winter. When a large quantity is grown, and it is desired to keep part of it until spring, before it is wanted, the best method will then be to protect it in the situation where it was grown. This, at least, has been our plan, and we have found it to be attended with complete success. The manner in which we have proceeded to do so, has been as follows:—Before frosts, severe enough to injure the tops, occur, we cover up the ridge formed by the earthing up of the stems, with leaves, sea-weed, or coarse straw, preferring either of the two first to the latter: this covering should extend down the sides of the ridge, and should be about six inches thick, and should be put on in rather a dry state. This covering is to be immediately protected with boards, put up in the form of a ridge also, so as to carry off all the rain, or water which may be formed from the melting snow, in the months of February and March. The top board on the east side, if the rows stand north and south, as they always should do, unless very inconvenient, should project over that, on the west side, from half an inch to an inch, thus allowing no chance for the water to find egress immediately over the roots. By this means, it will be carried away, and if the surface of the garden admits, the earth should be so thrown out in the autumn, as to allow the surplus water in the spring to be carried off from the ground in which the celery is planted.

By the middle of March, unless that month should be very severe, the ridge may be opened at one end, and the celery dug for use; and it may afterwards be dug from time to time, as it is wanted, and it will be found as fresh as if it had been dug in the preceding autumn. We have fully tried this plan, and can recommend it from our own experience.

It should be always borne in mind, that celery,

*And thence copied into the Farmers' Register.—
Ed. F. R.

intended for winter or spring use, should be of the large, giant, solid kind, and not the little pipe-stem, suckery variety, generally grown, which is only fit for early fall use, and, at the best, barely worth growing at all. Bailey's red or white giant, and Law's silver giant, are new sorts, deserving of extensive cultivation, and every one who appreciates good celery, should be particular, and obtain one or the other of them. Attention to this, and procuring seeds which *can be relied upon*, will prevent much disappointment, and repay the cultivator for his trouble.—*Ed. M. H.*

SEEDS FROM SOUTH FLORIDA.

We have to acknowledge the receiving from Dr. Henry Perrine, of Indian Key, seeds of several tropical plants, which grew in the southern part of Florida. These were, 1st, the "kidney seed cotton," described at length in a former communication of Dr. Perrine in our last volume of the *Farmers' Register*; 2nd, seeds of the "perennial bean;" and 3rd, seeds of the "coontee root," or arrow root, the natural growth of which furnishes food to the savages. These seeds have been distributed among some of our subscribers who have green-houses, or who reside far to the south.

TEXAN STATISTICS.

The whole story told.—The following minute statistics of Austin are said to be correct. On the first of January, 1840, the whole population, members of congress, speculators, gamblers, loafers, and all, amounted to 856—whites 711. White adult males 550, white adult females 61, children 100, families 75, mechanics 35, lawyers 4, physicians 6, printing offices 2, taverns 6, stores 9, groceries 9, billiard room 1, and faro banks 6.—*Houston Star.*

REMARKS ON THE SOILS IN GENERAL, AND PARTICULARLY THE RIDGE LANDS, OF EASTERN VIRGINIA.

For the *Farmers' Register*.

The peculiar and remarkable features of the highest or ridge lands of lower Virginia deserve more consideration than they have received. These features are scarcely known at all except to the residents of that region, and even of these, very few have cast a thought upon the circumstances referred to, which are general and uniform through an extensive territory, and yet very different from the surface of the earth in general elsewhere, whether considered in regard to agricultural qualities, chemical composition, or geological structure. In presuming thus to refer to geological character, let me not be understood as pretending to any scientific knowledge on that subject, but merely to having observed the great and obvious effects of the removals and depositees of earth by

water, which even an unlearned observer may easily learn, although learned geologists have either passed over the facts without notice, or have neither explained nor investigated them.

Strangers to this region, and especially the residents of our mountainous region, are impressed with the belief that the low country of Virginia, is one wide level surface of low-lying land; and even when they travel through it along the main public roads, which are always on the most level routes, they are first struck with surprise to find that there *are* some hills in the tide-water region, and that the land is generally dry, and also high, except near the borders of the Chesapeake bay and the ocean. They are also surprised to find but a very small proportion of low land formed by alluvion, and still subject to be overflowed by the streams which had made the deposite; and indeed, except our tide-marshes and miry and inundated swamps, that in fact there is less wet land in the low than in the high country. Still the traveller who kept on the usual routes of travel would retain the opinion that the country was generally and remarkably level; but if he were to cross those routes, in the direction of the streams, he would form the equally mistaken opinion that the face of the country was remarkably broken, by the frequent alternation of hills and narrow valleys or ravines. Both of these opinions are true to a certain extent, and each is false, if applied generally or extensively.

A correct idea of the configuration of the lands of the tide-water region may be had by supposing, first, an almost perfect plane surface declining by imperceptible degrees towards the sea-waters. Next, suppose this even and slightly inclined plane to have been deeply guttered and furrowed by the passage of every river, and their largest tributary streams, and more slightly by every small brook and rivulet trickling from the highest head sources of streams. Lastly, suppose the hill-sides formed by thus cutting down the channels by the waters, at first necessarily precipitous, to become gradually sloped by the operation of natural and obvious causes, in the course of thousands of years. Such is now the surface of the tide-water region, and indeed, though in a less marked manner, such is the next great region above the falls of the rivers, extending almost to the most eastern spurs of the mountains. Thus, if on any correctly marked part of the map of Virginia, any intermediate point be taken between two rivers, and a course be drawn so as to avoid the heads of every smaller stream that flows to the one or the other river, a route may be pursued for many miles, which would have scarcely any perceptible rise or depression. Such a route, to be kept always on the highest and most level ground, would of course be made very crooked by the numerous head springs of interlocking streams, flowing to both sides; and therefore no such route is ever precisely followed, by a road, or for any practical purpose. Still, if it were done, meandering and zigzag as such courses might be, they would be, to the eye, perfectly level, (and very nearly level even if measured accurately,) and stretching and branching through the whole country, from the sea-coast almost to the mountains. And as nearly all the public roads are on these ridges, and varying from them only to avoid too great departures from the shortest courses, it explains sufficiently why the roads may

be nearly level, even when passing through a very broken and hilly country.

It is not only that these level ridges may be found and traced through their long and tortuous courses between our great rivers—as between the Potomac and Rappahannock, or York and James rivers, but also branches of these principal ridges run out between every two of all their thousands of tributary streams. And though the channels of the smaller streams are of various elevation, and generally higher in proportion as they are of small size, or remote from the great waters into which they finally are emptied, the different characters and elevations of the streams have no bearing on the intervening ridges, which, whether separating the largest rivers or the smallest tributary rivulets, preserve nearly the same general elevation, character and appearance, according to their position and distance from the ocean. Thus, it follows that the dividing ridges, presenting these strongly marked characters, are in fact as numerous as the streams which so abundantly water our country; and which, if pursued to their head springs, and counting every branch of a rivulet, of course are twenty times more numerous and extensive than appear on the maps. These numerous ridges, and all connected, except where separated by the great rivers that pass through the mountains, form the ribs or frame-work of this region, and are as close laid, and as much connected with each other, as the innumerable streams which may be likened to arteries and veins of the great body.

From this description it will be gathered that though the surface of the country is in fact very uneven, and in many parts very hilly, still that all the summits of all the ridge lands form separated parts or curved lines in the same great imaginary inclined plane; and which plane I suppose to have been formerly real and continuous throughout, when the earth was deposited by the great overflowing waters, and before the subsequent action of streams had cut out and washed away, in forming their channels, the valleys through which they now flow.

That the whole tide-water region was once the bottom of the ocean, and for many ages, is manifest from the existence of thick beds of fossil sea-shells, which underlie the whole, or nearly the whole, at depths below the present surface varying from a few inches to nearly 100 feet, according to the dip of the bed of shells, (or marl, as improperly called,) and the thickness or elevation of the now covering upper earth. Afterwards, by some mighty convulsion of nature, this bed of the ocean was lifted up so as to be elevated far above the sea-water, and fresh-water floods poured over and deposited upon it, in different strata, earth of various kinds of texture, from almost pure sand to the stiffest clay, but all agreeing in the absence of calcareous earth, and of any enriching material to form productive soil. The upper cover of all, which forms the present upper layer, and its surface the thin and poor soil of the highest ridge lands, it may be supposed was the last deposit from the deeply covering and then stiller water, and that this last deposit was left over the whole land. There is a remarkable uniformity in this soil, in its shallowness, its poverty, the universal and total absence of carbonate of lime, and the very small proportion of lime in any other form, the absence of stone of every kind,

and even of pebbles and gravel. The texture varies from the stiffest and most intractable clay to a very sandy soil. Still this does not prevent a general and remarkable uniformity of character, caused by agreement in other particulars. Still, there is every where a much greater proportion of sand in these soils than would be supposed. The very stiffest soils I have found to contain more than 50 per cent. of pure silicious sand, but mostly so finely divided as, when separated, to be in the form of an impalpable powder, more like the finest wheat flour than grit or sand. It is this state of minute division of the silicious sand, more than the proportion of argillaceous earth, (or the pure matter of clay,) that gives their different degrees of stiffness to all these ridge-land soils.

The gentle slopes and steeper hill-sides, formed first by the streams cutting down perpendicularly and deeply through various strata of earth, and these precipitous descents being in time sloped and graduated as they now are—the materials being mixed by the washing of water, from top to bottom—present soils of various textures and qualities, all of them being much more fertile than the barren ridges, but still far from being valuable at first, and still less for being retentive of their earliest fertility. Sometimes on these sloping lands the soil is very stiff, sometimes very light, sometimes, but very rarely, showing rolled or water-worn stones, and very frequently gravel in great quantity—according as sections of these different horizontal strata have been laid bare, by washing through them, or as these materials were carried down by water and spread over other soil.

Still lower, and only near the tide-waters, the streams have cut through the beds of fossil shells or marl; and thus mixed with the far greater mass of various poor earths washed down from the higher slopes, have been swept down by the torrents, and deposited below, forming the alluvial bottoms, and almost the only naturally fertile lands of lower Virginia, except some of the higher river banks and borders, which have been formed in a different manner.

The supposed agricultural character and value of the ridge-lands and slopes were described in the following words, in the 'Essay on Calcareous Manures.'

"With some exceptions to every general character, the tide-water district of Virginia may be described as generally level, sandy, poor, and free from any fixed rock, or any other than stones rounded apparently by the attrition of water. On much the greater part of the lands, no stone of any kind is to be found, of larger size than gravel. Pines of different kinds form the greater part of a heavy cover to the silicious soils in their virgin state, and mix considerably with oaks, and other growth of clay land. Both these kinds of soil, after being exhausted of their little fertility by cultivation, and "turned out" to recruit, are soon covered by young pines which grow with vigor and luxuriance. This general description applies more particularly to the ridges which separate the slopes on different streams. The ridge lands are always level, and very poor—sometimes clayey, more generally sandy, but stiffer than would be inferred from the proportion of silicious earth they contain, which is caused by the fineness of its particles. Whortleberry bushes, as well as pines, are abundant on ridge lands—and numerous shallow basins

are found, which are ponds of rain water in winter, but dry in summer. None of this large proportion of our lands has paid the expense of clearing and cultivation, and much the greater part still remains under its native growth. Enough however has been cleared and cultivated in every neighborhood, to prove its utter worthlessness, under common management. The soils of ridge lands vary between sandy loam and clay loam. It is difficult to estimate their general product under cultivation; but judging from my own experience of such soils, the product may be from five bushels of corn, or as much of wheat, to the acre, on the most clayey soils, to twelve bushels of corn, and three of wheat on the most sandy—if wheat were there attempted to be made.

"The slopes extend from the ridges to the streams, or to the alluvial bottoms, and include the whole interval between neighboring branches of the same stream. This class of soils forms another great body of lands—of a higher grade of fertility, though still far from valuable. It is generally more sandy than the poorer ridge land, and when long cultivated, is more or less deprived of its soil, by the washing of rains, on every slight declivity. The washing away of three or four inches in depth, exposes a steril subsoil (or forms a "gall") which continues thenceforth bare of all vegetation; a greater declivity of the surface serves to form gullies several feet in depth, the earth carried from which covers and injures the adjacent land. Most of this kind of land has been cleared, and greatly exhausted. Its virgin growth is often more of oak, hickory, and dogwood, than pine; but when turned out of cultivation, an unmixed growth of pine follows. Land of this kind in general has very little durability; its usual best product of corn may be, for a few crops, eighteen or twenty bushels—and even as much as twenty-five bushels, from the highest grade. Wheat is seldom a productive or profitable crop on the slopes, the soil being generally too sandy. When such soils as these are called rich or valuable (as most persons would describe them,) those terms must be considered as only comparative; and such an application of them proves that truly fertile and valuable soils, are very scarce in lower Virginia."

The ridge-lands are universally acid in a high degree; which, according to the doctrines maintained in the work above quoted, is but repeating in other words the great deficiency of lime, and asserting the great value and profit of using calcareous manures on these otherwise worthless soils. It is on ridge-lands that the greatest improvements by marling have been produced in lower Virginia; and when once so improved, these will be permanently among the most valuable lands in the whole region. On some of the lands from which the above quoted picture was correctly drawn, I have since made as much as 35 bushels of corn to the acre, without any manure, except marl; and the land marled at different times, from one year to twenty years before, showed, in the crop of 1839, degrees of improvement increased in proportion to the length of the time which had passed since the first and only application of the manure. It is these extensive and before seeming hopelessly barren lands, which, when marled, will make lower Virginia both a rich and healthy region. For the same defect of natural constitution which forbids these poor soils to hold putrescent matter, and

thus store up fertility, causes the products of putrefaction to be diffused through all the atmosphere, for the production of disease; and the same process which will retain the food of plants in the soil, cuts off from the air its previous supply of poisonous exhalations.

In generalizing the characters of the different soils of this great region as above, and attempting to arrange them in separate classes, let me not be understood as meaning that the distinguishing marks belong to all of each class, or that there are always certain and evident lines of separation and distinction between the different kinds of soils named. I have stated the strongest marked features of each, though but a small proportion of the whole surface is so strongly marked. And as the surface is passed over by insensible gradations from the ridge of the slope, there is an intermixture of characters in most places. Thus, ridge-lands of any extent no where preserve throughout their precise rigid character, but in some places more or less partake of that of the slopes. For strictly speaking, the ridges being the precise lines of separation between streams flowing to opposite directions, are extremely narrow; but as the same ridge formation stretches out into the intervals between the side springs, the same general character of soil may spread for miles in width, and over the general surface, with the exception of the narrow margins and very slight slopes of the head springs and their brooks. Again—the soils designated as on "slopes," though being on a surface generally declining from the highest ridges, still are sometimes level for considerable extent, and even take in many of the lower ridges between the branches of small streams. These exceptions, and the grounds of them, are obvious both to the practical observer, and to one who would merely judge of effects from the causes above supposed. The explanation is rendered necessary, however, because the terms used, "ridges" and "slopes," are not sufficiently precise, or descriptive.

In the whole of the tide-water region, to which my description of soils and the levels of surfaces are more especially applicable, though often broken in surface, and even very hilly, (in common parlance,) still, correctly speaking, there is no such thing as a hill between the falls of the rivers and the sand-hills on the sea-shore; that is, there is no spot of land rising from all sides greatly or even considerably above the general level. What are called hills, are numerous enough, and often high, and sometimes steep. But they are only slopes rising from a lower to a higher level, and on the sides of a deep ravine or narrow valley cut down through the general level or plane of all the ridges. The thick forest growth on these ridges, serves to form the visible horizon from every point of view; and that horizon is every where as even in height and as level as it is possible for any forest growth to be.

The very remarkable and continuous levels of the summits of the ridges, notwithstanding their narrowness and crookedness, suggest some other considerations which will be briefly mentioned. They present the most admirable sites for the construction of rail-roads, if the route is at all suitable to the points of supply and demand of agricultural products. The advantages for this purpose are not only in the near approach to a level

surface, and the slight descent that exists agreeing with the course of the heavy products; there are others, in the cheapness of excavation, the cheapness of the land itself, and the abundance of timber, which still covers most of these poor lands.

The lines for railways have always been chosen to suit the interests of existing towns; and therefore there has been but little regard paid to the remarkable facilities offered by the natural formation of the face of the country. Every considerable railway yet constructed in Virginia, crosses the direction of the ridges and the streams, and no where coincides for any considerable length with the summits of a ridge. The survey, however, of the railway proposed from Petersburg to Farmville, (and which, fortunately for the subscribers could not command support enough to be undertaken,) was made for nearly its whole extent on a ridge of the kind described, (that which divides the tributaries of the Appomattox, from those of the Nottoway and Meherrin rivers,) and the report of the engineer served to confirm fully the views above exhibited, and those which caused that route to be chosen. Except for the short distance at each end, where the level route offered by nature was departed from to reach the towns of Petersburg and Farmville, the railway might have been made on as perfect a level as any alluvial flat would furnish, and without crossing a single depression or stream, except from choice, to shorten the distance of the too crooked ridge. But this level route of about 50 miles is far from being the full extent, even in a generally direct line. If the continuation of the most level natural route had been the object sought, and not the termination being made at existing marts, the same ridge might have been pursued, without any material departure from a level or from a direct route, westwardly to the spurs of the mountains, and eastwardly to the tide-water of James River. Again—if after passing above the highest head springs of the Meherrin, another branch route were to be pursued through the south-east part of Prince Edward county, and nearly along the line which separates that county from Lunenburg, and thence south and south-westwardly through Charlotte county to Moseley's Ferry, then such a continuous ridge-route would be found extending about 110 miles from the lower James River to the Roanoke, and departing no where materially from a level, except immediately at its two terminations, where necessary to descend the banks of the rivers. This example is presented to exhibit the peculiar nature and great extent of these ridges, and not to propose such a visionary scheme as the execution of any such railway, or so unprofitable an investment as any railway, in addition to those already constructed in Virginia.

Lest it should appear, by omitting the mentioning of them, that there are no other soils in lower Virginia than the ridge-lands and the slopes, with the low bottom lands interspersed among the latter class, I will merely bring to the reader's notice the naturally rich soils of the river banks, which are indeed of small amount in proportion to the general surface, and of various textures and kinds, but all as remarkable for natural and long enduring fertility, as most of the other high lands are for the opposite qualities. These rich but narrow margins of the tide-water rivers, are rarely more than half a mile wide, and sometimes not

fifty yards, on the higher banks. On the lower lying lands they are much wider; and some of the largest as well as most fertile farms are formed principally of such soils, as Sandy Point, Brandon, Weyanoke, Westover, Berkeley, Shirley, Curle's, &c., on James River. These bodies of low, though perfectly dry lands, are generally in the form of peninsulas, or "necks," extending into the river, and their formation was manifestly the result of ancient alluvion, or by the deposit of a wide and deeply overspreading flood, which was poured in a torrent in the same direction as the now low and gentle current continues to flow towards the ocean. To return to the supposition presented (for the purpose of illustration,) in the first part of this article, it would seem that when the whole territory was covered with one uniform and level deposit of earth from a previously covering flood, and that, after the earth was left naked, the rivers remained dammed up, and unable to pass by sufficient channels to the ocean. But that at last the barriers gave way through the present channels of the rivers, and the enormously accumulated flood passed off, leaving abundant evidences of its effects produced in that passage, when the volume and force of the water was perhaps a thousand times greater than of the rivers in their present state. The obvious alluvial origin of the lands above named, and many others, though they are far higher than the present highest waters, the depressions furrowed out in the peninsulas and promontories, and their direction towards the east, the order in which earthy deposits were left, in conformity with the laws of specific gravity and the suspension of solids in moving water, the narrow fertile margins of the highest of the river banks, all show beyond question the former action of either the still or the rapid waters of a flood perhaps 100 feet higher than the present level of tide. It was by the intermixture of soils thus caused, and especially by the bringing down and spreading widely the fine calcareous earth from the mountain region, that the very narrow strips along the tide-waters were made so fertile, and present so striking a contrast to the great body of the country. This small portion of land was thus *marled* and made fertile by the direct agency of the Creator; and to those of his creatures who would rightly observe and reason upon this operation, it also offers a revelation to men, and instruction conveyed by practical illustration and example, of the manner in which they may proceed and themselves imitate, if not quite equal, the great fertilizing works of nature. E. R.

GRAFTING ON THE WILD CHERRY.

From the New Genesee Farmer.

Some three or four years since, I observed an article in the Genesee Farmer, stating that the cultivated cherry would not grow when inoculated or engrafted on the wild black cherry. Seeing no good reason why it should not, I determined to try the experiment. I procured and planted some of the seeds; they grew and produced fine thrifty stocks. A year ago last summer I had some of them inoculated from our best English cherries. I examined them in the autumn, and they appeared to do well. Last spring, I had some fifty

or sixty others engrafted; they appeared to adhere finely, soon after pushed out their leaves and grew vigorously; indeed, they appeared to be doing quite as well as those worked on the stocks of the English Mazzard cherry. I then came to the conclusion that the story of their not growing on the wild cherry was all humbug. And had I possessed more leisure at that season of the year, I fear that I should have come out with a communication, stating my success in the experiment. But soon my grafts and buds began to wither, and before midsummer the most of them had ceased to be. Some few have remained green during the spring and autumn, but I do not expect to find one of them alive in the spring. B. H.

Buffalo Nursery, January, 1840.

N. Y. STATE AGRICULTURAL CONVENTION.

From the Cultivator.

Assembly Chamber, February 4, 1840.

The convention was called to order by Mr. J. J. Viele, of Rensselaer, on whose motion the Hon. George W. Patterson, of Livingston, was called to the chair, and Jesse Buel appointed Secretary pro tem.

On motion of Mr. A. Van Bergen of Greene.

Resolved, That a committee of five be appointed to report suitable names for officers of this convention.

The chair appointed Messrs. Van Bergen of Greene, Beekman of Columbia, Viele of Rensselaer, Tucker of Albany, and Johnson of Kings, said committee, on whose report the following gentlemen were unanimously appointed officers of the convention

ROBERT DENNISTON, of Orange,	<i>President.</i>
CHAS. E. CLARKE, of Jefferson,	} <i>Vice Presidents.</i>
JEREMIAH JOHNSON, of Kings,	
DANIEL TOFFEY, of Dutchess,	
BENJAMIN ENOS, of Madison,	} <i>Secretaries.</i>
LUTHER TUCKER, of Albany,	
HENRY D. GROVE, of Rensselaer,	

The counties being called over, about one hundred delegates enrolled their names as members of the convention.

On motion, *Resolved*, That Messrs. Beekman, Bement, Van Bergen, Nott and Bergen, be a committee to report the business to be presented to the convention.

On motion, of Mr. Beekman, Messrs. Duane, Viele, and Buel, were appointed a committee to examine a book called the Farmers' Library, and report upon its merits as a common school book—the book having been submitted by the author for that purpose.

The following preamble and resolution was introduced by Mr. Nott:

Whereas, a bequest has been made to the people of the United States, by the late Mr. Smithson of England, for the purpose of improving the intellectual and moral condition of mankind, leaving it to the congress of the United States to designate the mode of its application; therefore,

Resolved, That a petition, signed by the president and secretary of this convention, be presented to congress, praying an appropriation of a portion of said bequest, for the establishment of an Agri-

cultural School. [Referred to Messrs. Beekman, Morris and Nott.]

The convention then adjourned to 4 o'clock, P. M. to-morrow.

Assembly Chamber, Feb, 5, 1840.

Mr. Beekman, from the business committee, reported the following resolutions.

1. *Resolved*, That in the opinion of this committee, the culture of silk is an object well worthy its attention, and that a committee be appointed to report upon its present state, and what advancement has been made in it in the United States, in the last six years. [Committee Messrs. C. E. Clarke of Jefferson, and C. Bergen of Kings.]

2. *Resolved*, That this convention regard the culture of the sugar beet, with the view to the production of sugar and the feeding of stock, as a branch of agriculture that may be rendered very profitable to the farmer, and that a committee be appointed to ascertain what advances, if any, have been made in the culture of the beet and the making of sugar therefrom, in the United States, and how far it may enter into competition, with other vegetables or grains, in the feeding of stock. [Committee, Messrs. J. B. Nott and Wendell.]

3. *Resolved*, That this convention cause a committee to be appointed, whose duty it shall be to report at a subsequent meeting, if any, and what improvements have been made in the last twenty years in the management of farms, and if so, to what extent it has added to the resources of the state, or the wealth, respectability, intelligence, and comfort of our population. [Committee, Messrs. Beekman and Van Bergen.]

4. *Resolved*, That a committee be appointed to inquire into and report upon the particular method of farming adopted in some of the best cultivated counties of this state, and how far that method would be applicable to other portions of the state. [Committee, Messrs. Viele and Knickerbacker.]

Whereas, doubts have arisen in the minds of some as to whether there has been any improvement in farming in the last twenty years, and if there has, that it has been owing to natural causes, and not to the advancement of the art; therefore,

5. *Resolved*, That a committee be appointed, whose duty it shall be to investigate this subject, and to report what would now be the profits and value of two farms, (say of 100 acres each,) the one cultivated under the present, and the other under the old system. [Committee, Messrs. Gaylord and Bement.]

6. *Resolved*, That this convention would respectfully urge upon the public, and especially farmers, the great practical utility of reading agricultural papers, as it would add much to their usefulness as farmers and their intelligence as citizens.

The convention then took a recess to hear Mr. Van Bergen's Address, and Professor Dean's Eulogy before the State Agricultural Society, after which it adjourned to 7 o'clock in the evening.

Assembly Chamber, 7 o'clock, P. M.

The preceding resolutions, from the business committee, from 1 to 6, were severally taken up, and after discussion, adopted, and the several committees annexed to each, appointed.

On motion of Mr. A. Walsh,

Resolved, That a committee be appointed to prepare and present a petition, on the part of this convention, to the Legislature now in session, for

a law to organise a Board of Agriculture, to consist of eight members, one from each Senate District, with an appropriation of \$5,000, for the use of such Board, to be expended in such manner as it may deem most likely to advance the interests of agriculture.

Messrs. Duane, Walsh, Van Bergen, Beekman and Tucker, were appointed a committee to memorialize the Legislature, pursuant to the above resolution.

On motion of Mr. C. Bergen, of Kings,

Resolved, That as numerous and incontrovertible evidence has been given the past year, of the practicability in this country to produce silk, to a great and advantageous extent, as evidenced by exhibitions at the American Institute, in the city of New-York, as well as elsewhere; and as the importations for the past, in that article, clearly exhibit that it is one of the greatest drains of our wealth and probably the greatest means of extracting specie from our country—and as it is highly important for the American people to prevent these evils, it is therefore recommended that some action should be had by the Legislature now in session, to do something more effectually to encourage the production of this elegant article, either by directly offering a proper stimulus to exertion, or by passing resolutions requesting congress to impose suitable duties, that will afford ample protection to those engaged in this branch of agriculture.

Resolved, That as the American Institute, of the city of New-York, has, ever since its existence, greatly evinced its usefulness and benefits to the interest of agriculture, as well as to mechanical skill and the arts, it is therefore recommended that this convention respectfully suggest to the Legislature the propriety of making, at least, a small appropriation to that very useful institution—without which its existence must either be abandoned, or its benefits and usefulness very much diminished.

Mr. Morris, of Westchester, from the committee to whom was referred the resolution relative to the Smithsonian bequest, reported the following resolution, which was adopted:

Resolved, That a committee be appointed to procure the passage of a resolution by the senate and assembly of this state, requesting congress to appropriate a portion of the Smithsonian bequest to the establishment of an agricultural school, in the city of Washington.

Messrs. J. B. Nott and C. E. Clarke, were appointed said committee.

Mr. Bergen, of Kings, offered the following resolution, which was adopted, and Messrs. T. B. Wakeman of New-York, C. Bergen and Gen. Johnson of Kings, P. Potter of Dutchess J. J. Viele of Rensselaer, and A. Van Bergen of Greene were appointed a committee to prepare the report,

Resolved, That a committee of six be appointed to prepare a report on the future prospects of agriculture, manufactures and the mechanic arts of this state, to be illustrated by such statistics as the committee may deem appropriate, and that the report, when completed, be published in the Cultivator and the Journal of the American Institute.

THE EXTIRPATION OF WEEDS.

From the Cultivator.

It may be doubted if any branch of agriculture, is more indifferently conducted in this land, than the *extirpation of weeds*. In the corn field and in the potato patch indeed, the hoe may perform its part tolerably well; and in the summer fallow, the plough turns over and smothers these noxious incumbrances; but traces of that vigilance which should mark their first encroachment, and of that perseverance which should return to its task till the work of destruction is completed—are too rare amongst us. How many honorable exceptions to this charge of negligence, can be found on a hundred adjoining farms? We put this question without rigidly insisting on the rule, that "good farmers suffer nothing to grow but their crops."

Let a careful observer traverse the country in summer, and he will find, in many places, the *St. John's wort* extending its yellow bloom over the fields and meadows without one effort to check its progress. Here the *'wild teasel* is slowly advancing without interruption from the road side into the pastures; and there the sulphur blossoms of the *field mustard* amongst the oats and barley, show it already in possession, far and wide. The *quitch grass*, the *dock*, the *ox-eye daisy*, the *horse-thistle*, the *mullein*, the *milk weed*, the *yarrow*, and others of less importance—if they do not, like a neighbor's pigs and geese, devour the pasture, at least they occupy the space where grass ought to grow, and rob it of the nutriment which ought to increase its growth. We are mistaken, if more loss is not sustained from vegetable, than from animal, intruders.

The above list is long, but we have not yet done. The *burdock*, the *tory weed*, and the *cockle bur*, are most injurious to wool; and the *stein kraut*, (red root, or pigeon weed,) and *biennial chamomile* seem to poison the growing wheat. The two last of those weeds come in so slyly, or rather without observation, that the farmer is sometimes taken by surprise when he beholds the ruin of his crop.

There is one weed, however, so formidable, that all others, bad as they are, seem to shrink into insignificance before it. This is the Canada thistle—"the cursed thistle" of England, and if any plant can deserve such a name, this is the one. It is in a fair way to cost us more than the Florida war—but description would be useless to those who have marked its progress in spreading over the fields, or whose fingers have been pricked by it when securing their crops.

The Canada thistle effected a lodgement in this town, more than 35 years ago; but its progress within the last five years has been more rapid than at any former period. Fields that had not been previously encumbered with it, have had of late so many new seedlings, that the land is rendered almost unfit to be sown with wheat; and without much perseverance it will be entirely so in a few years.

In pastures and meadows, indeed, the progress of this thistle is comparatively slow, being checked by the grass and the compactness of the soil; but when the ground has been ploughed for oats, spring wheat, and barley, or even for a summer fallow, if not more than three times it spreads out in every direction; and a patch, that might be covered with

a sieve, in one or two years, will increase to several rods in diameter. Into these circles, if the growth is rank, many farmers are unwilling to enter, leaving the crop as well as the thistles to stand undisturbed.

Now, what are we to do? becomes a very important question. In answering it, we should say that the farmer ought to be watchful in passing over his fields, both before and after ploughing, so as to mark every new patch that appears; and then, without the delay of a single week, he ought to *dose* the root of every separate stem with strong brine. A dry day is the best for this purpose. We have generally made a hole large enough to hold a gill or more, with the corner of a hoe, cutting the stem as far down as that instrument reaches. When we have used old brine, one application has always been enough to destroy them; and in this way, *taking them in time*, a little attention, and a little labor, would prevent great damage.

If the patch, however, has become too large to be treated in this way, its further progress may be checked by applying brine in the manner proposed, to all such as stand near the circumference.

It should be remembered, however, that most of these patches consist of a single plant with many stems, unless broken by the plough; and that we cannot destroy them unless we attack the whole. If, therefore, they are protected by fences or other obstructions, these ought to be removed; and then by perseverance and frequency in either ploughing or hoeing, their destruction may always be accomplished,—sometimes in one, but in two without failure. D. T.

Cayuga Co. 1 mo. 30, 1840.

THE CULTURE OF MANGEL WURTZEL AND SUGAR BEET, FOR STOCK. BY WM. GARBUTT, OF WHEATLAND.

From the New Genesee Farmer.

It is known to many of our readers, that Mr. Wm. Garbutt was one of the first who commenced the culture of the mangel wurtzel in this section of country. And while president of the Monroe County Agricultural Society, he did much to introduce that practice of root cultivation, which is now found so advantageous to farmers throughout the Genesee country. Mr. Garbutt has an extensive wheat farm, and keeps a good assortment of stock. He grows large quantities of roots, and considers this crop of great importance to the wheat farmer, as it enables him to till more land, and keep a larger amount of stock at the same time, to better advantage than he could possibly do otherwise. Mr. G. has kindly furnished us with the results of his long experience in the culture of mangel wurtzel, which we are happy to lay before our readers.

It should be kept in mind, that the culture of sugar beets is in all respects the same as that of mangel wurtzel.—*Eds. N. G. Fr.*

The proper soil and preparation.

I consider a rather heavy loam, with an open gravelly bottom, the best of all soils for mangel wurtzel or sugar beets. I had rather it would incline to clay than sand. Strong wheat soil, such as is too heavy for corn, if it has not a hard bottom, so as to retain too much wet, will do well for

this crop, if sufficiently enriched. Some will suppose that such land will be too apt to bake and become hard in summer, but that is easily prevented by proper manuring and after tillage. Many persons fail in their root crops from want of a proper selection of soil, or rather from not adapting the crop to the soil. The ruta бага carrot will not flourish on a heavy soil, but require a sandy loam; while the English turnips delight in new land or a low mucky soil, such as is too cool and wet for other roots.

It is very important that the ground for mangel wurtzel be not only of the right kind, but in the best possible condition—well enriched and free from weeds. The previous crop, therefore should be some hoed crop, as potatoes or corn which should be well manured and kept free from weeds. In preparing the ground for mangel wurtzel, I would recommend that a good thick dressing of well rotted manure be spread on and ploughed under in the fall. The quantity of manure should of course depend on the richness of the soil, but, I would say, be sure and *give enough*—the crop will repay, with interest. There is little danger of this crop suffering from over manuring. I prefer ploughing the land in the fall, because it is desirable to plant early in the spring, and by exposing it thus to the frost during winter, it will be in much better condition in the spring.

About the first of May, which is usually as soon as the ground will work pleasantly, when not so wet as to clog, nor so dry as the lumpy, I prepare it for the seed. If the ground be manured and ploughed in the fall, I only give one good ploughing in the spring, with thorough harrowing (and if at all dry and lumpy, *rolling* and harrowing) until fine and mellow. If the ground be not made fine and in good order, it is difficult sowing, and the seed will not vegetate well.

I prefer ridging the land for mangel wurtzel, although some persons contend that it exposes the roots too much to the effects of drought. But if the ground be frequently stirred and kept from weeds there is little danger of the crop suffering from this cause. Whereas, by ridging the ground, the roots have a greater depth of warm rich earth, and with me always succeeded better than on a flat surface. I form the ridge by going through and back with a light plough. The ridges should be two and a half or three feet apart, so as to allow room for a horse to go between the rows. If the tops of the ridges are not smooth and mellow, it will be an advantage to go over them lightly, with a rake, by hand, before opening the drills.

Preparing the seed, and sowing.

The quantity of seed required for an acre is about three pounds. I had rather sow more than less, as it is easy to thin them out, and the cost of seed is nothing in comparison with the value of the crop. Much complaint is sometimes made of mangel wurtzel and sugar beet seed failing to grow. These seeds are not quite as sure of vegetating as some kinds; still, if rightly prepared, and sown when the ground is in good condition, before the weather becomes too dry, they will very seldom fail of growing. The seed should always be *soaked* in soft water, standing in a warm place, for *three or four days* before sowing. The shell of the seed is very hard, and requires a long time soaking for it to become softened so that the

germ can burst it open. I have sometimes known it to fail after being soaked, owing to late sowing and dry weather; but I have never known it fail from excess of moisture, even though soaked a number of days before sowing, and followed by long rains afterwards. My experience is decidedly in favor of early sowing. I prefer to sow as early as the first of May, if possible, and had rather sow a week or two earlier, than later.

When every thing is ready for sowing, I pour off the water from the seed, and roll it in white plaster, (slacked lime or flour will answer,) so as to give it a white appearance, in order that it may be more easily seen on the ground in sowing.

I have never found a machine or drill harrow with which I could sow the seed to my liking. My method is as follows:—I constructed a machine for opening the drills, to be drawn by a horse. Take a piece of scantling, about 4 feet long, and 3 or 4 inches thick, in which place two thills or shafts for the horse, and two handles to hold by, like a small horse-rake; but instead of a number of teeth, only place one peg, or tooth, about one foot long, on the under side, within about a foot of the right hand end of the beam, so that when the horse walks in the furrow between the ridges, the tooth will come on the top of the right hand ridge, by passing along which it will open a drill for the seed. The machine can be easily guided, and the drills may thus be all prepared in a very short time. If the patch to be planted be small, of course the drills can be made by hand, with a hoe or stick. They should be about two inches deep, or so that the seed will be at least an inch deep when covered over smoothly. I sow the seeds by hand, scattering them along the drills, about two inches apart. This can be done very regularly and rapidly after a little practice. The seed should be sown as soon as possible after the drills are opened, and covered over immediately after being sown. Cover with a hoe or rake, so as to leave the ridges smooth, and the work is completed.

After culture—hoeing, thinning, transplanting, &c.

The seed does not vegetate very quickly, and if the weather is cold, it will be several weeks after sowing, before the plants are all fairly visible. In most cases, two or three plants will come up from one seed or capsule; and as soon as they are all plainly visible, I go over them and pull out the extra plants, leaving only one in a place, about two inches apart. If this is not done early, and they are allowed to grow together until they are of any considerable size, they retard each other's growth, and cannot be separated without injury. If young weeds have sprung up, they should be destroyed by a light hoeing at the time of the first thinning. In about two weeks, or as soon as the plants begin to acquire some strength, and weeds begin to appear, I go over them again with the hoe, and at this time pull out about half of the plants, leaving them four inches apart. I also go through between the rows with a horse and shovel-plough, (a common small plough or a narrow cultivator will answer,) in order to stir the earth and keep it loose, as well as to assist in hoeing and killing weeds.

If any vacancies occur in the rows, they may be filled by transplanting; observing to take the

plants up without injuring the roots, and set them straight and firmly in the ground. I have sometimes transplanted large numbers, but they seldom do as well as those which grow where sown. The young plants are not very liable to be destroyed by insects. Mine are never injured by the fly or any insect except the black grub, or cut worm, which sometimes thins them out for me not quite to my liking, and I have to fill up the vacancies by transplanting.

As soon as the plants acquire sufficient size, we begin to use them as greens for the table, thinning them out of the rows as desired. They are much esteemed for this purpose by my family and hired men, and during harvest we use large quantities of them with great advantage and satisfaction. The roots are very good for the table when young, but they become rather coarse as they grow old.

Reserving a sufficient quantity for table use, the remainder of the plants should be thinned out at the third time of hoeing, to the distance of ten or twelve inches apart. Care should be taken to keep the ground free from weeds; and if the soil is heavy and inclined to become hard, it should be frequently stirred by going through with a horse and plough, or cultivator. This is particularly necessary after rains, before the ground becomes dry. I consider frequent hoeing and stirring the soil, with liberal manuring, the great requisites of successful beet culture. Some persons may suppose, from reading these directions, that the culture of this crop is laborious and difficult; but such is not the case; at any rate I do not know of any crop which better repays for the labor bestowed on it than this. The quantity and value of the produce is so great, in comparison with the amount of land and labor required, that he who neglects, or only half cultivates this crop, in my opinion, practices very poor economy.

Harvesting and preserving the crop.

Slight early frosts do not injure this crop, the harvesting may therefore be deferred until severe frosts are expected, which is usually about the middle or latter part of October. Some persons recommend stripping the leaves and feeding them to cows, &c. before the time of harvesting. But I consider this practice decidedly injurious, as it not only stops the growth of the roots, but exposes them to injury from frost. If any are wanted for feeding before they have done growing, the best way is to pull them out where they stand too thick; or, if their growth is completed, they may be pulled up clean where most convenient.

My manner of harvesting is as follows:—I pull up four or five rows and throw them together in one row; then go between with a wagon and load them on to it, and draw them to the barn, where the tops are cut off, and the roots put into the cellar under the barn. I consider the tops of great value for feeding cows and other cattle; and if thrown into a shed or barn they will keep good for feeding several weeks. Those who have no proper cellars, may preserve the roots in pits in the field. They are not as liable to injure by heating as turnips or carrots, and if too large a quantity are not put in one heap, they will be in no danger from this source. The best way to bury all such roots, is to make the pit long and narrow, and pile the roots up pretty high. Beets are not so easily injured by freezing as potatoes, and need not be covered

more than about half as deeply with earth. The end of the pit may be closed with a few bundles of straw, so as to have easy access to the roots when desired.

Amount of produce, feeding, &c.

Not having taken particular pains to weigh or measure my crops, I cannot say exactly what the amount of produce is per acre. But judging from the number and weight of the loads, and the space which the roots occupy, I should think that I obtained, upon an average, about twenty-five tons from an acre. I this year raised three acres, and harvested one hundred and two large loads of about a ton weight; one-fifth of which we calculated for tops.

I feed the roots to all kinds of farm stock, except horses. For milch cows, fattening cattle, hogs and sheep, I find them of great advantage. Some animals will not eat them freely at first, but they soon learn to eat them readily. I let them first get well hungry, then cut a few roots and sprinkle on them a little bran and salt. My horses alone do not seem to fancy them. They prefer carrots instead, and if worked hard, want a few oats in the bargain. I feed my milch cows half a bushel of mangel wurtzel each per day, with hay. They keep in good condition, and give milk freely all the winter. Fattening cattle require a bushel or over per day. They thrive and fatten finely on them. For working oxen I think they are superior to any other food, especially when worked hard in the spring, and during hot weather in summer; as they will do more work, and bear heat better than with any other food. The roots can be kept through the summer if desired. I keep my store hogs on them almost exclusively during the winter, and they thrive admirably. With the addition of a little corn, hogs fed on these roots will fatten rapidly and make good pork. Sheep also do extremely well on them; and they are superior to all other food for feeding ewes at lambing time in the spring. I keep 130 ewes, and find them greatly benefited by this practice. For sheep and hogs it is not necessary to cut the roots, but for cattle I cut them to pieces with an axe or spade. A proper machine for the purposes would be some advantage.

I use very little hay, as my sheep and young cattle are fed only straw with the roots. They eat the straw readily without cutting, and keep in good condition. Thus by raising only two or three acres of these roots, I can devote nearly my whole farm to grain, and at the same time keep a large amount of stock, with good profit.

Wheatland, Monroe co., N. Y.

CALCAREOUS SOILS OF LOWER SOUTH CAROLINA AND GEORGIA.

From the (Ga.) Chronicle & Sentinel.

Messrs. Editors:—Having lately passed through the eastern section of the Carolinas, and in Georgia along the Savannah River, my attention was directed to some of the great mineral resources of this section of country, which appear to be entirely unappreciated by its inhabitants. I refer particularly to a great deposit of limestone which I first observed in Jones county, N. C. near the

Santee, and afterwards in the western part of Charleston District, S. C., and again on the Edisto, and in Georgia at Jacksonboro, where there is now a small kiln, not at present however in use. The purity of this rock, which approaches that of chalk, renders it admirably adapted for the production of lime, and yet notwithstanding its abundance, the facility of procuring wood, it costing nothing but the labor of cutting and hauling, and the great expense of lime, Charleston and Savannah, and all the Southern coasts continue to be supplied with Thomaston lime. Were men of capital and enterprise once aware of the means they have at hand, and of the relative cost at which this article may be produced in the two sections of country, it seems hardly possible, that the South should look much longer to the North for lime, any more than, as was once the case, they did to Germany for brick!

Lime is burned at Thomaston, Me., with wood, which never costs less than \$3 a cord. Fine anthracite coal has lately been introduced, and partially used as fuel, which may reduce the expense a little; but from the lowest estimates, as given in Dr. Jackson's Geological Reports of the surveys of that state, it cannot be produced at a less expense than \$77 the hundred casks, which includes the price of the casks. These should hold, by law, each five bushels, but they have been found to contain less than a common flour barrel—three and a half bushels may be taken as their average capacity. The expense of transportation, &c. makes them worth at Charleston about \$2 per cask, or more; and as it is carried into the interior, its value rapidly increases, till on the very spot, where the rock occurs in the greatest abundance, it has long been sold for \$3 per cask!

In the Chester valley, Penn., lime is sold at the kilns for 12½ cents per bushel. It is burned in large kilns holding 1600 bushels, with only sixteen cords of good hard wood, which costs \$2.50 per cord. Fine anthracite coal is there used also to some extent, but the lime is not afforded any cheaper than that made with wood. At Pottsville where coal is used altogether, lime costs twenty cents; the rock, however, has to be transported some twenty-five and some eighty miles.

From the slight opportunities I have had of judging, I can see no reason why lime should not be made as cheap and as abundantly in South Carolina and Georgia, as in the Chester valley. Suitable stone for making kilns may not always be found conveniently at hand, but if granite can be transported from Quincy to build churches and houses, it, or a better material may, also, to build kilns, and substantial ones made, which should last many drawings. Pine wood can every where be obtained for little or nothing. Of the relative cost of labor to effect the same end, I know nothing. But as to the quality of the lime the southern may well compete with the northern in purity and strength, though prejudiced workmen may for a time refuse to adopt the change, as is invariably the case with any alteration introduced in their business, which they, naturally enough, think they understand better than any one else. As an instance of this, lime made from a particular rock in Rhode Island, a magnesian carbonate of lime, is prepared at double the price in New York of Thomaston lime, while a precisely similar quality of lime, made from a rock, which is chemically the

same at the latter place, but which happens to be an unusual variety there, meets with no sale in New York at a very low price.

Some of those in South Carolina may not make so white a lime as the northern, but it will be equally strong and similar for mortar, and farther in the quarry it may be found purer. Very little of it, however, will be liable even to this objection. That from Jacksonboro' is remarkably white.

By opening the same bed on the Savannah river, where it must occur, with a few kilns there, and also on the navigable parts of the Santee and Edisto, a company of enterprising men, or one man with a capital, might, I believe, supply all the lime required for Charleston, Beaufort, and the whole southern coast, for half the present cost of the Thomaston lime, and afford it to the neighboring planters at a price, which would make it an object to them to use it for renewing worn out lands, and keeping up those under immediate cultivation, without their being compelled continually to clear new land, and cultivate extensive tracts for crops, which, with the aid of lime, might be produced on half the number of acres.

These observations, a traveller's notes merely, are at your service, Messrs. Editors, and if they may call attention to some of the neglected advantages of this country, it will afford me much pleasure, that I made them.

J. T. H.

RED ROOT, IN CLOVER SEED.

From the New Genesee Farmer.

As the time for buying and sowing clover and grass seed is at hand, permit me to raise a warning voice, for farmers to beware of sowing foul seeds on their lands, especially that of *red root*.—

I consider this weed a much worse enemy to the wheat grower than even the Canada thistle. It has already obtained a lasting foothold on some good wheat farms in this section, to the great detriment of the crop, and, in my estimation, reduced the value of the land about one half. For, when the ground once becomes seeded with it, it is next to impossible ever to get rid of it; as the seed is produced very abundantly, and is of such an imperishable nature, that it will lie dormant in the ground for years till a favorable opportunity presents, when it will spring up and seed again most plentifully. The seed is rather larger than that of clover, of a brown color, nearly round, rough and very hard. Any person acquainted with it will readily detect it in clover or grass seed; but those who have never seen it would not be apt to observe it.

MONROE.

CARROTS AS FOOD FOR HORSES.

From the New Genesee Farmer.

Mr. Geo. Sheffer, of Wheatland, called at the seed store, a few days since, and gave us some account of his success in the culture and use of roots, for stock; particularly in feeding horses on carrots. He raised last season, beside other roots, about 300 bushels of carrots, which he feeds mostly to three working horses, giving them one bushel each per day, together with hay. He has fed

them in this manner nearly three months steady and kept them at work most of the time. He formerly fed his horses half a bushel of oats each per day, with hay; and from the results of his experience, he is fully convinced that one bushel of carrots is worth as much for horses as half a bushel of oats. His horses eat much less hay than when fed on grain, and keep in as good order, and appear as well able to work. He thinks that horses fed on carrots, with a small quantity of oats and hay, will do better than when fed on oats and hay only.

DIVERS THINGS.

For the Farmers' Register.

In looking over your two last numbers, I have been amused as well as instructed to see how doctors disagree, and my wonder is much excited to find that some who have railed and travelled their patient in "seven league boots," have called a halt, and propose something that is better. I wish they may succeed. My experience has taught me that the constitution of land is perpetually varying and changing as you supply it with calcareous and vegetable matter. Any vegetable matter is good; but that which has been animalized, that is, passed through the intestines of some animal, is greatly preferable. With profound respect for all clover-lay farmers, I would suggest that they cut their clover, and, if they please, throw it into their farm-yards, until it is well saturated with urine and the fluid excrement, and in that state spread it, thick or thin, give it a dressing of 30 to 60 bushels of lime, and bury with two good horses. If the land thus treated be dry, you will have better crops of corn, wheat, or clover, than the same land produced when fresh from the wood. Some land will yield better than others, and so it is of some fields; I presume for this plain reason, that they are constitutionally different. My own farm is divided into seven fields, (besides lots,) four of 60 to 70 acres are thus cropped: first, corn, wheat, or oats, then clover, clover pastured freely. Three fields are appropriated to follow thus; wheat, clover, clover or oats, wheat, clover. My corn land gets all the manure I can give it during the spring, the fallow the balance. Of those seven fields, no two are alike constituted. I selected the dry lands for corn, the wet for fallow, and I would particularly recommend this practice to young beginners, or old who have begun wrong.

It is contrary to all of nature's laws, that land filled and saturated with water should improve, or produce grain; and any application of manure, lime or plaster, is a folly as well as a loss. I will demonstrate, if I have time, that the poor land of Virginia wants nothing but lime, clover and plaster, to make it good; and if I do, then I hold I shall render greater service to my country, than all the political babblers that have lived in the last century. And by the way, sir, can you tell me of any other animal that will persevere to the death in the destruction of his own pasture, besides the politician and the hog?

Our wheat is very promising, and our clover three weeks earlier than usual. I have much to say about lime, but I will keep that for another communication.

FAIRFAX.

ACCOUNT OF AN AGRICULTURAL EXCURSION INTO ST. JOHN'S, BERKLEY. BY THE EDITOR.

From the Southern Cabinet.

All of the crops grown in the state are cultivated in the parish of St. John Berkley. The lower part embraces the whole of the western branch of Cooper River, and the northern half of the eastern branch. On these two branches are some of the finest rice plantations in the state. Of their management, we do not propose to treat at present but confine our remarks to the crops grown in middle and upper St. John's. Of these, the most important is *cotton*. The variety grown here is what is known in commerce as the "Santee," an inferior kind of Sea-Island or Black Seed, which inferiority is in a great measure, if not wholly, produced by locality. We say in a great measure, for no one who has witnessed the great improvements made on the Sea-Islands in the staple of their cotton, but must be convinced that a similar improvement could be brought about wherever the same variety of cotton is grown. We do not wish to be misunderstood. We do not believe that the fineness of the staple of the Sea-Island cottons could ever be attained, by cotton grown beyond the influence of the sea atmosphere, but we think that the Santees might, by the judicious selection of seed and application of appropriate manures, be grown to as great fineness as the Sea-Island cottons were before the recent great improvements. The reason why we suppose that the Sea-Island cottons can never be successfully rivalled in fineness is, that the peculiar atmosphere in which they are grown, is wanting as soon as we leave the coast, and this cannot, as far as our experience goes, be in any manner supplied. So great an influence was supposed to be exerted by this atmosphere, that plantations in the interior of the islands and on the main, (although bordering on tide-water,) were supposed not capable of producing the finest varieties of cotton. Experiments, however, have been made, and experience now sanctions the opinion, that the finest cottons can be grown on such, by the judicious application of saline manures, the atmosphere not being so materially changed in its transit as to affect the staple.

Prof. Shephard is now engaged in analyzing the soils of Edisto Island, at the request of the agricultural Society of St. John's Colleton. We view this as a most important step taken towards the advancement of our agriculture, and the society merit the thanks of the community for it, which we hope to see imitated by all of the agricultural societies of the south, especially of this state, and even by individuals. No one with whom we are acquainted, is better able to carry on this nice investigation than the able Professor to whom the agricultural society of St. John's Colleton have assigned it. The many advantages which would arise from an accurate analysis of our soils, are so obvious, that we scarce feel warranted in alluding to them. We, however, cannot refrain from mentioning a few. The first is, that having ascertained the component parts of a fertile soil, and the relative proportions of each ingredient, we can by analysing our own, discover in what it is deficient, or in what it superabounds, and if practicable, apply the remedies which may bring it nearer the standard we aim at. Again, it

will enable us to correct and bring into culture spots, and in some instances acres, which at present are wholly unproductive, when cultivated in particular crops. For instance—it is well known that in many fields, both on the islands and main, there are spots which produce what is called the "blue cotton," which yields nothing. Other spots are subject to the "rust,"—as soon as these are analyzed, and compared with fertile soils, their excess or deficiency, in any particular ingredient, will at once be detected, and the remedy applied. The analysis, therefore, of the first quality of Sea-Island cotton lands will at once establish a standard, by which all on which are grown the same varieties of cotton can be judged. The same benefits will result from analyzing on the soils in which other crops are cultivated. But will the analysis of the soils of Edisto Island benefit our friends of St. John's Berkley, or elsewhere?—much, for they will, by it, become acquainted with the component parts of the best soils for growing Sea-Island cottons in, and by analyzing their own they can at once ascertain the difference, and how near, by admixtures, or application of manures, they can approximate. But to return to the culture of cotton in St. John's Berkley.

The soil of Middle St. John's is a light loam, while that of Upper St. John's is so light, that it may almost be termed sandy. It is seldom that a field, selected for cotton in this parish, is cultivated in any other crop. The selection being generally made on account of the supposed adaptation of the soil to this particular plant, or the locality of the field. Small fields are sometimes alternated, but the large scarce ever. All of the crops, however, (cotton, corn, and potatoes,) are planted in lands 4 feet apart, so that whenever any change is made in the culture of a field, the labor of preparation is not increased, by having to level down and re-form new beds at an altered distance. As soon as the crop has been ginned, preparation is made for planting, and each planter endeavors to have his fields ready by the 25th of March. Most of the planters adopt the plan of placing the manure under the list, or rather they strew it between the rows, and then form a list which of course mixes the manure, cotton stalks, weeds, grasses, and earth (forming the list) well together. A very small bed is made on this, which is gradually increased in width, (but not height,) at each working. Some, however, prefer to make the bed at once of the size intended, and endeavor to keep it thus throughout the season. The hoe in this and the subsequent operations is the principal instrument used. The plough, if used at all, is only employed to break up the alleys. Formerly the "skimmer" was much used, but from some cause which I could not learn, it has been laid aside. From the 20th March to 1st April, the crop is planted. The holes are not made as formerly, by the hoe, but by what is here termed a dibble; made from a 2½ inch plank, 6 inches wide and tapered to a half inch, at the bottom, whilst the upper part is formed into a handle. Across this, a groove is cut diagonally, into which a lath or thin piece of board is fixed, which can be readily adjusted to different distances, and is of such length as to touch the ground when the dibble is struck into the bed, and marks the spot where the next hole is to be made. The usual distance is from 20 to 24 inches, and it is supposed that two hours

is gained by using the dibble in place of the hoe. The thinning commences at the second working, is continued at the subsequent and completed, by the time the plants are six inches high—one stalk only being left in each hole. Of course each planter endeavors to keep his fields as clear of grass as possible, and hoes as often as he can, which however is seldom more than five times. The crop is usually laid by, from the 20th to the 25th July—but we find that the opinion of some of the best planters, is in favor of laying it by, by the 1st of July, even though it be a little grassy; working it later, they think, increases the growth and prevents the pods from maturing. In hoeing some increase the size of their beds, gradually, whilst others are careful so to perform this operation that no new surface is exposed, by which they have less grass to contend with, as nearly all within germinating distance springs up and is destroyed in the first workings. As soon as from 15 to 20 lbs. can be picked, (which is usually by the first week in September,) some hands are sent in; no task is given in picking cotton, though they generally average from 90 to 100 lbs. when the pods are well open. Three of Dr. Ravenel's negroes, last fall, picked in September 136, 140, and 142 lbs. each. The cotton is spread out in the field as it is picked, and the next day on the scaffold. It is then housed until wanted for the gin, when it is passed through the whipper to free it from dirt, and this operation is repeated after it is ginned, to clear it of broken seeds. Some of the planters sort and pick their cotton before it passes through the gin which renders the labor of moting it much less. Generally, however, nothing is done to the cotton until it has been ginned, which operation is mostly done in this parish by the foot gin—on some plantations, in conjunction with Farries' gin worked by horse power, which is considered the best yet used, and gets out from 250 to 300 lbs. per diem. The average product in this parish does not exceed 100 lbs. per acre, except when manured; the average on manured land is supposed to be 150 lbs. Upwards of 250 lbs. have been made on sixty acres.

We have, in the above, given the outline of the culture as practised in this parish, and will now notice a few particulars more in detail. We have stated that no rotation is followed, and one of the strongest reasons assigned, (and one not readily got over) is, that the three principal crops (cotton, corn and potatoes) are cultivated in such unequal quantities, that a rotation with these is out of the question, and no other crops at present offer sufficient inducements. But although no rotation at present can be established, yet the crops grown on some of the small fields are at times alternated. It has been found that cotton and corn can be cultivated, by the aid of manure, for an indefinite period, on the same soil, without diminution of product, yet potatoes cannot, no matter what quantities of manures may be applied. Corn succeeds, as is well known, admirably after potatoes; but for years it was believed that cotton could not be successfully grown. This, however, was an error which is now happily corrected. It only requires, as Major Porcher has fully ascertained, that the ground be bedded up, very early, (say in January) so that the beds may consolidate, as the cause of the cotton's dying appears to be connected with the looseness of the soil; the more compact

the bed is the better will be the "stands," and the sooner it reaches the hard earth under the bed, the sooner will it grow of. Hence the reason for small beds. This is directly at variance with the practice pursued on the Sea Islands, but of their culture we hope hereafter to give some interesting details, and will not here enter into any comparison.

Many experiments were related to us, going to show that corn and cotton may be grown for years consecutively on the same field, without deterioration or diminution, when proper quantities of manures have been applied; in fact, that old fields have been actually restored to what is supposed to have been their original fertility. Several were mentioned to us, but we do not find the quantities of cotton stated but in three instances, one a field at Mexico, (Major Porcher's) which has been cultivated without rest, since 1801, and seldom planted in any other crop than cotton, yielding the last year 176 lbs. per acre. The other is the field of Mr. Thomas W. Porcher, already alluded to, which produced 170 lbs. per acre. Dr. Ravenel's fields, which have been in the culture of cotton for years, have also materially improved, the average, the last year, being 150 lbs. per acre. The manure most relied on, and the only one in fact which has been used in any quantities, is the compost, made, as we have already stated, by hauling into the stables, cow, hog and sheep pens, the leaves gathered in the woods, where they remain until spring and are then carted out. Of this, from 250 to 300 bushel baskets full, are considered sufficient for an acre of cotton. Plaster of Paris has been used with decided effect by Mr. H. W. Ravenel and Mr. S. G. Deveaux, but unfortunately the experiments have not been repeated, and were not made with that accuracy which enables us to judge of its relative value. We hope, however, to have the pleasure of giving to our readers some further experiments with plaster hereafter. Various other manures have been tried; such as swamp mud, fowl dung, cotton seed, &c. We conversed with no one who had experimented with the first, but understood that it was but little used, it not having been generally found beneficial. Perhaps this has been owing to its having been taken fresh from the swamp, and applied to the crop. All the experiments we have ever made with swamp mud, went to prove that it could not be advantageously used unless it had been exposed for some time to the action of the atmosphere, or was corrected by the admixture of lime. We would suggest to our friends of St. John's, (especially the upper part, where the soil is so very light,) whether a most excellent imitation of marsh mud, which has been found of such immense benefit to the cotton crops of the Sea Islands, could not be made by adding to the mud taken from the swamps, a small quantity of lime or marl and of salt, the latter perhaps in the greatest proportion. We hope some of the planters will make some small experiments with a manure thus formed. The benefit, we think, will not be confined to the productiveness but extend to the quality also. Fowl manure cannot be obtained in any very large quantities, but as very little manures a large space, it is also applied to the cotton and with great effect. Cotton seed is chiefly reserved for the corn. When used for cotton, it creates too luxuriant a growth, and the pods are late in open-

ing. Several experiments have been made with lime and salt, but these generally have been so loosely made, that nothing definite beyond the fact that they were beneficial, could be gathered from them. Mr. Frederick A. Porcher, of Somerton, has made greater use of these two manures than any other planter in St. John's, and has kindly furnished us with an account of his operation with both, and which being interesting, we give in full.

"In 1839, I applied to a small field of cotton, limestone in the proportion of sixty four bushels to the acre. The soil was originally a good loam, of the quality indicated by the growth of oak and hickory. This, I presume, from its contiguity to two large swamps, and from the growth of the forest land in the neighborhood. I do not know when the land was cleared, but it must have been a great many years since. It had obviously been subjected to a long course of exhausting cultivation. When I first took it in, it was covered with the broom grass. A crop of slips I believe was the first step taken towards reducing it to cultivation, and this was followed, every alternate year, with a crop of cotton. During the alternate years it rested—manure was freely given. The first crop, that of 1835, was almost a total failure—that of 1837, promised better, but it did not yield more than 75 lbs. of clean cotton per acre. Perhaps it shared the fate of other crops on lands of a better reputation, the autumn of 1837 having been peculiarly unfavorable to the maturity of the cotton. The products of the field from the crop of 1839, is, as well as I can judge, a fraction below 150 per acre.

"The lime used was procured from the margin of a creek on the plantation. It lies about six feet below the surface of the highland. It is of various appearance—some of it being so hard that it is with difficulty broken by the pick axe, while others crumble with the application of very little force. Fossil remains abound throughout the strata, but more in the loose masses than in those more compact and hard. I have reduced all to quick-lime in the kiln, and have found it quite available for mortar.*

"The lime applied to the land was broken with a hammer, a very toilsome operation, and in that way applied. The field is laid off in square half acres, and contains, in each acre, sixty rows, each 150 feet in length. To each of these rows a bushel of the pounded lime was applied on the list. The land was manured as usual. The quantity of manure applied I do not recollect; I am sure it did not exceed sixteen horse cart-loads to the acre.

"I left the plantation in May, before the lime had had any time to develop its agency, and did not return until October. In June, my overseer wrote me that he could not perceive the action of the lime, except perhaps in the increased vigor of the growth of the joint and nut grasses with which the field is infested. Some time in July, he wrote that the limed cotton was improving rapidly, and recommended its application to every acre of cotton which should be planted. The lime did not cover the whole field, the part not limed is of a character more congenial to cotton than the other. The lime gave out in the middle of a pond. In

this pond I doubled the quantity, and instead of one bushel put two, that is, at the rate of a hundred and twenty bushels to the acre. Here the success of the experiment was striking. The pond, as far as the lime went, had a luxuriant growth of productive cotton on it, whilst on the rest a few poor stalks, here and there, alone indicated the presence of cultivation. No pains were taken to separate the product of the limed part from the rest.

"The application of wood ashes to a hitherto unproductive pond, in the quantity of a peck to the row, or from fifteen to twenty bushels to the acre, was attended with the same, or even more striking results.

"My brother, in 1836, manured some of his lands with shell lime, bought in Charleston—the quantity applied was a peck to the half acre row, or 19½ bushels to the acre. The land was planted in 1836, 1838, and 1839, in cotton. The first year no effect was observed—an improvement was perceptible in 1838, and markedly so in 1839. The soil was a poor clay loam. The lime was slacked when applied. His experiments with ashes, in the quantity mentioned above, were all eminently successful.

"Salt was used on my plantation in 1836 and 1837. The first year its successful results was most strikingly manifest. A field of sixty acres, lying on the edge of Bigen Swamp, had been treated in the following manner: part of it, say 30 acres, was cleared and planted in cotton in 1832; the crop of cotton was continued without intermission every year. In 1834 and 1835, the remaining 30 acres were cleared and planted with cotton. In 1836, the whole field of sixty acres presented portions which had been one, two, and four years under cultivation. No doubt was entertained of the propriety of planting the two first portions, but it was thought advisable to give the third portion a dressing with manure. Accordingly a quantity of compost was prepared, and about thirty bushels of salt, or a bushel per acre, thrown upon it. This was spread upon the land, and this part, then under cultivation without intermission for five years, yielded a greater quantity per acre than the rest of the field, which was much more fresh. The difference was perceptible to the eye. I sold upwards of one hundred and fifty weight of cotton per acre from this field, at a price higher than any Santee cotton at that time in Charleston brought, *except cotton raised under the same treatment*. This experiment was made under the direction of my brother, the late Dr. J. P. Porcher, who superintended my plantation during my absence from the state.

"The use of salt was repeated in 1837, but without any marked result. In no case was there such a favorable opportunity of comparison, as in the preceding year. The cotton crop was a bad one. One great use of salt as a manure for cotton, seems to be the quality which it imparts to the plants of holding the fruit which it bears. I do not know whether it stimulates and promotes production, but it certainly appears to act as a conservative to the product. Such was its only apparent agency in the successful experiment of 1836. My brother continued the use of salt, and the result of his cropping has shown that he did not exaggerate its value."

Mr. Porcher, intends making considerable use of both the lime and salt. When we had the pleasure of visiting Somerton last we found large

* Prof. Shephard has kindly promised us an analysis of this limestone.

quantities of the rock, got out for the purpose of being converted into lime, and we understood from him, that he had purchased a considerable quantity of salt to be used as manure. One fact we would call the attention of our planters to, and that is that the *cotton, manured with salt*, brought a higher price than any other from the same neighborhood, sold at the time. Is it not worthy of inquiry and experiment, whether salt, added to other manures, (or alone) does not produce a finer staple independent of its effects in other respects? In a small pamphlet, published some few years since by Mr. Johnson, he enumerates the benefits to be derived from the use of salt to be—

"1st. By promoting in small proportions, putrefaction. 2d. By destroying weeds, grubs, &c. 3d. As a constituent or direct food. 4th. According to Drs. Darwin and Priestley, as a stimulant to the absorbent vessels of plants. 5th. By preventing injury from sudden transition in the temperature of the atmosphere; and 6th. By keeping the soil moist."

Corn.—There is nothing peculiar in the culture of this crop, unless it be in the great attention bestowed on manuring it. The preparation of the land is similar to that for cotton; the manure, which most generally is compost, is strewed (by some at the rate of 250 bushel baskets full per acre) in the alleys, and a heavy list made, on which the corn is planted, and not on beds, as when planted on beds, the stalks are two easily blown down. Cotton seed is invariably used as a manure for this crop, and is supposed to cause the greatest yield. Many planters apply it in the hill at the rate of a pint to each. Others reserve it until all danger of frosts is over, and apply it around the corn, and cover it with the hoe at the first working. By Mr. T. W. Porcher, it is placed at the sides only, which enables him to bury it when it sprouts, much more easily than by the usual mode of crushing with the foot and then covering it. When it is up, he sends ploughs into the field, and a fellow goes ahead of each with a spade and places it close to the corn, and between it and the sprouted cotton seed—the earth thrown by the plough completely covers the latter, while the corn is untouched. In this manner, he accomplishes much more than those who follow the old plan. In working it, most of the planters make but little use of the plough, and the reason assigned is the fear of spreading the nut grass, which has already become a source of great annoyance. A plan adopted by Messrs. Thos. Porcher, of White Hall, R. W. Ravenel, and perhaps others, is to work only every alternate alley at each time of going over, by which course of culture the roots of only one side are cut at a time; moreover a fresh stimulus is applied to the plants more frequently, by the stirring of the ground. They speak very favorably of this plan.

The average product of this crop in St. John's, is from 10 to 12 bushels. Dr. Ravenel usually averages about 22 bushels, and this on fields which are perhaps the oldest on his plantation, (itself among the oldest in the Parish.) These were very much reduced when he took possession, but by manuring highly, he has restored them to their present state of fertility. The Baden corn has been cultivated in small quantities by a large number of the planters, and universally condemned. It is found not to answer in our climate. The product

is not much greater than that of our flint, the grain very inferior, it is very easily blown down, is subject to rot if left until the usual time of harvest in the field, and when gathered in, is more liable to the attacks of the weevils. For these reasons, we believe but little of it will hereafter be planted.

THE CURCULIO.

From the New England Farmer.

Southborough, Feb. 22, 1840.

Dear sir,—I received a letter a few days since from you, desiring some information in protecting the fruit of plum trees from the depredations of the curculio. I have not stationed a hen and chickens around a tree since the spring of 1837, because they would injure other productions which were near the trees; but I should think from what I know of the habits of the curculio, that they would prove quite a prevention. I have studied the habits and character of the curculio in the two last summers, for I consider him the only obstacle in the way of raising that fruit.

1st. I have found that the curculio is on the tree ready for its operations very early, even before the plums are large enough for it to deposit its egg in them.

2d. It continues its labors into August.

3d. It gets on to the tree by flying, though it may crawl up the body at times.

4th. It stings the fruit mostly in the night.

The same curculio that stings the plum and peach I have found repeatedly operating on the apple. I was not aware of this fact till lately, and I do not know but there may be a larger species of the same insect which stings the apple also. I should think they were from the size of the larvæ often seen in apples. I should consider hens with their chickens stationed about the fruit trees, and daily shaking and jarring the trees (for the curculio always falls to the ground when the tree is shook) while the fowls were immediately under them, to prove quite a protection. The supposed remedy should be applied quite early in the spring, in order to warrant the greatest chance of success. The small birds are the natural enemy of this insect as well as most of the insect tribe, and it should be the aim of horticulturists and farmers to encourage their multiplication, and to protect them. I design to make further experiments to protect fruit trees against injuries from this insect, and should I make any discovery or advances, I shall be happy to communicate. Were it not for the curculio, most of our fruit would be comparatively fair, and all of it free from worms. A gentleman lately informed me that apples and other fruit were free from worms in the state of Ohio.

By the request of a friend, I gave the editor of the Worcester *Ægis* last summer a small article "on the cultivation of plums," in which the curculio is described, and some modes of prevention are spoken of in the article. I take the liberty to send you that paper, and also an imperfect drawing of that insect in this letter.

No information could be more important to the fruit grower than a knowledge of the character of the canker worm, the curculio, and the borer, and the best means of securing fruit trees against the injuries which they inflict. Respectfully, your ob't servant,

JOEL BURNETT.

CULTIVATION OF THE PLUM.

From the National *Egis*.

Mr. Editor: Sir—I am induced to offer you some observations of mine on the cultivation of plums. I have taken an interest in the cultivation of fruit for the last eight years, and now have several good kinds in a bearing state. The plum is one of our hardiest fruit trees. During our cold winters I lost pear, apricot, peach, and several of the Baldwin apple, by the severity of the cold, but not a single plum tree. Plum trees of almost all kinds are good bearers; they usually blossom full, and the fruit sets well, and it is certainly one of the most delicious fruits we have, when in perfection. The fine kinds are wholesome and salutary, and can be indulged in even to satiety, when fully ripe, without harm. They will grow well in rather a low loamy soil; if the soil is rich, they grow fast and come quick into bearing.

But the grand obstacle in the way of cultivating this fruit, is the depredations of a small insect of the beetle tribe, which commences its operations when the fruit is quite small, and continues them usually till the first of August. This beetle is called by horticulturists the curculio—is about one sixth of an inch long, has two small bunches or protuberances on its back, and a rostrum or beak, and on this two antennæ. By this rostrum it makes a semilunar incision on the plum, into which it deposits an egg. The egg hatches, producing a worm, or larvæ, which burrows down into the heart of the fruit, eating it through two or three times from end to end. This kills the life of the plum, causing it to wither and fall prematurely: the worm then soon leaves the fruit and enters the ground, where it undergoes a transformation or metamorphosis, common to the insect tribe, and then comes up a new curculio, to deposit its eggs as before described. Its work is not confined to the plum, but extends to the cherry, peach, and apple, though it would seem to prefer the plum to other fruit, on account, probably, of the smoothness of the skin, and the greater ease in making the incision. It is remarkable how general its depredations are on the plum tree when unmolested; for when the tree is loaded with fruit, and large, scarcely a single plum will remain unpunctured, and consequently all will be lost to the cultivator. Some kinds of peach and apple which have a woolly or furry surface, are not attacked. Almost all the wind-fall apples (as they are called) are produced by this beetle, and upon examination will be found to contain the larvæ or worm from the egg of the curculio.

The plum tree is subject to a disease on the limbs, a kind of excrescence or warty appearance, which Dr. Harris says is caused by this same curculio, puncturing the tender bark and depositing his eggs under it. "These swellings, or warts, are diseases of the bark, caused by the punctures of the weevil, and the residence of the grubs. The sap vessels being wounded and irritated by the insects, throw out an increased quantity of fluid; this is re-absorbed by the bark, which is consequently swollen and thickened in substance; the over-stretched cuticle bursts, and the swelling becomes irregular, granulated, and full of fissures."

Dr. Harris recommends cutting out and extirpating these excrescences and burning them before

the last of June. The wounds made in so doing should be treated with mortar used in grafting.

The character of the curculio is shy and timorous; so much so, it is seldom seen unless hunted after purposely. He is not often seen in motion on the tree, but occasionally in a small crevice or crack, or the axilla of a limb, and so much does he resemble an old blossom or bud, or a small piece of bark, that he will commonly remain unnoticed. Should the observer extend his thumb and finger to take him, ten to one if he don't elude him, falling as imperceptible as a small shot would to the ground.

The habits of this insect are not well known, I still believe, to fruit growers. I have made frequent inquiry of them for a preventive measure. Some have told me the insect crawled up the tree, and most of them have never seen it to know it. It is well to remark that it flies on the tree.

The following are some of the means of preserving fruit against the attacks of these insects.

First. All the premature fruit that falls to the ground with the worm in it, should be immediately gathered and burned. It will begin to fall as early as the 12th or 15th of June, and continue to fall until the middle of August, if not ripe before. This course, well pursued, will destroy the next generation of them and save the next year's crop.

Second. Shaking the tree briskly morning and night, and two or three times during the day, will very much discommode and interrupt them from pursuing their operations—for at each concussion of the tree the insects fall to the ground, and if they reascend, will soon become discouraged by this course of treatment.

Third. Let two or three hands take a sheet or sheets and spread under the tree, and then shake and jar it, and they immediately fall, feigning themselves lifeless, and appearing like a shapeless lump, and by those who are unacquainted with them, would not be taken for an animal until they moved. All that falls on the sheet should be immediately crushed. This last mode of destroying them should be practised twice a day while any are found. In the spring of 1837, I cooped a hen and chickens about an imperial gage, whose fruit was destroyed the preceding year, and about all the plums matured on this tree. It is probable that the beetles were destroyed by the brood, as they made their way to the surface of the soil. As this little animal is easily annoyed, trees standing before a store or shop or any frequented place, usually more or less escape injury. I have known trees standing near a hog pen mature their fruit year after year, while others, standing four rods distant, as surely failed.

Mr. Manning remarks in his book of fruits that plums thrive best near the borders of the sea, and, that the curculio is said to avoid the salt air.

If the foregoing remarks should prove of any advantage to horticulturists in the protection of fruit from injuries inflicted by this insect, or lead to minuter investigation into its nature and habits, I shall be well rewarded for this imperfect communication.

JOEL BURNETT.

Southborough, June 19, 1839.

THE FIVE-FIELD ROTATION AND GRAZING.

To the Editor of the Farmers' Register.

I have been highly gratified in reading the three very able pieces in the February number of the Farmers' Register, under the signatures of Rivanna, R., and my friend C. Braxton. The gentleman under the signature of R. has misunderstood me somewhat in my communication in the December number of your Register. He says, "to deprive the land of this (clover) its only recuperative crop, when it is required to bear three exhausting crops in succession, would be to induce sterility without giving check to the evil complained of," (insects,) &c.; but I do not think the fifth year's grazing will have that effect. My idea is, that the grazing year will be a year of rest as well as the fourth year, when the clover is allowed to remain on the ground, though not to the same extent; for I think that after the clover remains the fourth year on the ground, the grazing the fifth year will do no injury to the land, and yet check the insects. The land will be restored by the fourth year of clover, as I have heretofore had it, under the four-field system, and certainly not injured under the fifth year's grazing; for the grazing of good land with tolerably fat stock, (and the land to have fat stock must not be grazed to great excess, otherwise the stock will not be fat,) will rather improve it, than injure it, by returning their dung to the land. By rigid grazing I did not mean grazing to excess, or a naked pasture, but a good bite of clover or any other grass, and tolerably fat stock to return something to the land as well as to bite it off. Under the four-field system I have practised, we have grazed very little, and the clover, weeds and every thing has been turned in the land, until it is now full of vegetable matter, and it is a perfect bed for insects; and the winter, in so perfect and warm a bed, has no effect to kill them. My land is more filled with vegetable matter than most land in our country, in consequence of having omitted to cultivate corn, or any hoe crop for nine years, while I had in cultivation some reclaimed swamp land, which was alone cultivated in corn as long as the tide could be kept out; and the very peats, blue grass, &c. which R. so much dreads, got the advantage of me for a time, but which I have now conquered by the corn crop, once in four years, and which I think will be kept under by corn once in five years, together with the grazing once in every five years. To Rivanna, with whose communication I was highly delighted, I will say, that I think his system a most excellent one, and had thought of adopting a similar one before I saw his communication; but I have found from experience that clover will not bear much grazing at a year old; and if I give up my standing pasture, I must have a field which will bear a good deal of grazing. I think it is evident that Rivanna also thinks clover will not bear hard grazing the first year, from his recommending that his two clover fields should be moderately grazed, and not grazed until 20th June, and should be assisted with a standing pasture also, which, in fact, is a six-field system, and one which I should not hesitate to adopt, if I had another field to make a standing pasture of, and did not think that rigid grazing was absolutely necessary to get rid of the multitude of insects with which my land is now filled. The chinch-bug, as yet, is not the insect

with which I have most suffered, and the Hessian fly rarely does us much injury, (when the wheat is sown in good time, and on clover fallow,) but I have suffered most from wire-worm, cut-worm, corn-flea, and all the tribe of insects produced by non-grazing and clover-lays. Perhaps I mis-called the worm which injured my wheat so much last fall, when I called it a clover worm. It was the wire, or bud worm, which injures the corn in the spring so much on clover lands, and that was the reason I called it a clover worm. I think the clover, and non-grazing, has produced, or increased the number and variety of grubs very much, at least on my land; for I have remarked in the forest, or ridge-lands in our lower country, where they have little or no clover, and graze, they never suffer with grubs of any sort, and find no difficulty in getting their corn to stand. They suffer with Hessian fly, but never with the great variety of insects we have on the river in our wheat. Chinch-bug is a new thing with us, (having had it only two years,) and I did not allude particularly to it, when I spoke of changing my system on account of the increase of insects.

I think the objection to three grain crops in succession in a system of agriculture, is generally exaggerated, if the land is good, or if you have the advantage of lime, or marl. At least, I have found that my land improved under it very rapidly, and I should never have abandoned the four-field system, but for the insects. I think it is of not quite the consequence most persons attribute to it, though of some, that the crops should be distributed farther apart, provided you give sufficient rest to your land in the course of the rotation; and I think it all-important to let the clover wear out a little before you use the field as a pasture, so that other grasses will put up to bear the hoof, which clover will not do well, and which I think will be effected in the five-shift rotation I propose to adopt. In addition to which the suggestion of my friend C. Braxton, in his most admirable communication on the five-shift rotation, "that the plough should not be again brought into action before the sod is reformed, which will be in two years in land that is in tolerable condition, and this formation of sod is, I think, the test of reformation of soil," is most worthy of notice, for I have frequently remarked that when a standing pasture, or a lot, which had been some time in grass, even if poor land, was broken up, it will produce much better for several years than the most sanguine expectation would lead you to suppose. I cannot think the three grain crops in succession can be so very exhausting, after my own experiment for twenty-odd years, together with that of the two Messrs. Wickham of Hanover, (whose pardon I must beg for introducing their names here,) who have cultivated their estates for some twenty years in the same rotation, and also grazed them much more than I did, (and thereby have kept off insects much more effectually,) and have quadrupled their crops; for I well recollect when the two estates were cultivated in one, the whole never made half as much wheat or corn, as each of them now makes. It is true, that they are excellent farmers, and use marl liberally, which was not formerly done, but if the four-field system with three grain crops in succession was an exhausting one, even with marl, they could not have produced the very great improve-

ment I have spoken of above with all their good management.

I sat down, only to make a few remarks in reply to those most excellent communications of Rivanna, R., and my friend C. Braxton, and I find I have made a long, and I am afraid tedious communication. If you think proper, you will please publish it in your most useful Register.

Most sincerely yours,

HILL CARTER.

Shirley, March 8th, 1840.

AN IDEA OF THE UNIVERSE.

From the N. Y. Journal of Commerce.

In the Christain Keepsake for the current season, among a very creditable variety of articles furnished for that beautiful annual by British writers, is a splendid essay by the distinguished Dr. Thomas Dick, so well known in this country, by his works on various subjects kindred to that indicated by the heading above. The length of this essay makes it impossible to cite much of it in our columns, and as the volume itself will reach comparatively few of our readers, we have concluded to give them the doctor's leading notions in our own words.

He begins with what the senses of man command around him in the way of a *landscape*, and comparing this little space with what is immediately around us on all sides, observes that it would be requisite—taking the general average of a pretty extensive landscape—that more than nine hundred thousand landscapes of the extent we generally behold, should pass before our view, ere we could form an adequate conception of the bulk of the whole earth. The surface of the globe, he says, contains no less than 197 millions of square miles. No human mind can form a conception of this.

The earth, however, is but an inconsiderable ball when compared with other planets of our system. One of these bodies could contain within its dimensions nine hundred globes as large as the earth; another fourteen hundred; and were five hundred globes as large as that on which we dwell, laid upon a vast plane, the outermost ring of the planet Saturn, which is six hundred and forty-three thousand miles in circumference, would enclose them all. And yet these bodies seem only small bright specks on the concave of our sky.

Again—earth, planets, comets, and all—the whole subordinate solar system—how small it is, compared with its central luminary. No intellect can reach to the slightest conception of such a body. The sun is five hundred times larger than the whole, and would contain within its circumference thirteen hundred thousand globes as large as our world. To contemplate all the variety of scenery on the surface of this luminary would require more than fifty thousand years, although a landscape five thousand miles in extent were to pass before our eyes every hour. What a scope were this for the explorations of intellect and imagination throughout eternity!

But this system, with its sun, is but a point in the firmament. Before we could arrive at the nearest object in this firmament, we should have to pass over a space at least twenty *billions* of

miles in extent—a space which a cannon-ball flying with its utmost velocity, would not pass over in less than four millions of years. What hosts of orbs are visible here of a winter's night! How vast must they be! There is every reason to believe, that the least twinkling star which our eyes can discern, is not less than our sun in magnitude and glory, and that many of them are even a hundred or a thousand times superior in magnitude to that stupendous luminary. And as the Creator does nothing in vain, as he must be supposed always to act in the plenitude of his perfections, those thousands stars, which the unassisted eye can perceive in the canopy of heaven may be considered as connected with at least fifty thousand worlds, compared with the amount of whose population, all the inhabitants of our globe would appear only as "the small dust in the balance." Here the imagination might expatiate for ages of ages, in surveying this position of the Creator's kingdom, and be lost in contemplation and wonder at the vast extent, the magnitude, and the immense variety of scenes, objects, and movements, which would meet the view in every direction. For here we have presented to our view, not only single suns and single systems, such as that to which we belong, but *suns revolving around suns* and systems around systems—systems not only double, but triple, quadruple, quintuple, and all in complicated but harmonious motions—*motion*—more rapid than the swiftest planets in our system, though some of them move a hundred thousand miles in an hour—periods of revolutions which vary from thirty to sixteen hundred years—suns with a *blue or green* lustre revolving around suns of a white or a ruddy color, and both of them illuminating with *contrasted colored light* the same assemblages of worlds. And if the various orders of intelligences were unveiled to our view, what a scene of interest, grandeur, variety, diversity of intellect, and of wonder and astonishment, would be open to our view!

And still we should be on the verge of creation! The visible is as nothing compared to the invisible. The milky-way is found to consist of clusters of stars; and the late Sir W. Herschel in passing his telescope along a space of this zone, fifteen degrees long and two broad, descried at least fifty thousand stars large enough to be distinctly counted; besides which he suspected twice as many more, which could be seen only now and then by faint glimpses, for want of sufficient light; that is, fifteen times more than the acutest eye can discern in the whole heavens, during the clearest night; and the space which they occupy is only the 1-1375th part of the visible canopy of the sky. On another occasion, this astronomer perceived nearly six hundred stars in one field of view of his telescope, so that in the space of a quarter of an hour, one hundred and sixteen thousand stars passed in review before him. Now, were we to suppose every part of this zone equally filled with stars as the spaces now alluded to, there would be found in the milky-way alone, no less than 20,190,000, that is, twenty millions, one hundred and ninety thousand stars, or twenty thousand times the number of those that are visible to the naked eye. In regard to the *distance* of some of these stars, it has been ascertained that some of the more remote are not less than five hundred times the distance of the nearest fixed star, that is, at least 9,940,000,

000,000,000, or nearly ten thousand billions of miles; a distance so great, that *light*, which flies at the rate of twelve millions of miles every minute, would require one thousand six hundred and forty years, before it could traverse this mighty interval!

Such is the explanation of that "apparently irregular belt which appears only like an *accidental tinge on the face of the firmament*." Millions of magnificent suns, where not a sparkle can be distinguished by human eyes!

And now, the doctor asks, what shall we say if this vast assemblage of starry systems be found to be no more than a single *nebula*, of which several thousand, perhaps even richer in stars, have already been discovered? and that it bears no more proportion to the whole sidereal heavens than a small dusky speck which our telescopes enable us to descry! Such is the present theory, and it is founded on most elaborate observations by the first astronomers of modern times.

And here a calculation is entertained as to the extent of what may in one sense be called the *visible universe*. There have been more than 3000 of these *nebulae* already discovered. Supposing the number of stars which compose the Milky Way to be only ten millions, (half the number formerly stated,) and each of the *nebulae*, at an average, contains the same number; supposing farther, that only two thousand of the three thousand *nebulae*, are resolvable into stars, and that the other thousand are masses of a shining fluid not yet condensed by the fiat of the Almighty into luminous globes—the number of stars or suns comprehended in that portion of the firmament which is within the reach of our telescopes would be 20,000,000,000, or twenty thousand millions, which is twenty millions of times the number of all the stars which are visible to the naked eye!

Still our philosopher suggests even these assemblages of systems may be but as a single *nebula* to the whole visible firmament, or even as a grain of sand to the whole earth, compared with the invisible universe beyond!

Speaking of what was called the planetary *nebulae*, which are round, compact bodies, like planetary disks, when viewed through telescopes, Herchel mentions one in the constellation of Andromeda, "that would more than fill the whole orbit of Uranus," which is three thousand six hundred millions of miles in diameter. Such a body would, therefore, contain 24,429,061,600,000,000,000,000,000, or more than twenty-four quadrillions of solid miles, which is sixty-eight thousand four hundred millions of times larger than the cubical contents of the Sun! Hundreds of these *nebulae* have never been resolved into stars. Some are thought to be luminous matter in process of condensing. One of these, in the Sword of Orion, is computed to be 2,200,000,000,000,000,000 times larger than our Sun. All these bodies may be supposed to be advancing to the formation of new systems for replenishing the void of space, and displaying the Creator's glory.

The *motions* of this universe are the subject of a concluding hint. Nothing in nature is quiescent. Every thing goes in its stated orbit. And the rate of these motions, in every known instance is not less than several thousands of miles every hour, and, in some instances, thousands of miles every minute. The fixed stars, though to a

common observer they appear nearly in the same position with regard to each other, are found, in some instances, to have motions far more rapid than those of any of the planetary globes, though their magnitude is immensely superior. The stars sixty-one Cygni, whose apparent motion is five seconds annually—and consequently altogether imperceptible to a common observer—yet at the distance at which this star is known to be placed this motion is equivalent to one hundred and twenty billions of miles every year; or three hundred and twenty thousand millions every day.

Such, modestly remarks the doctor, are a few rude ideas respecting the universe. All these objects, however, do not constitute the universe. They are detached parts of it, and may be as nothing to the whole. Of this whole, man probably may never be able to form a conception.—The highest created intellect may not. To God only does it seem likely to be known.

SEPARATE AGRICULTURAL PUBLICATIONS AT THE FARMERS' REGISTER OFFICE.

We frequently receive from subscribers requests to send single copies of the 'Essay on Calcareous Manures,' and accompanied with the expression of regret at not being able to send payment of so small an amount as 50 cents. We have never failed to send the work, when requested by any one for his own reading, whether ordered with or without payment, (and these small dues from remote debtors are very rarely paid in any after time,) for the publication was made that the work might be read as extensively as possible, and not with any expectation of making a profit by the amount of sales. But it is very easy for any person who desires to obtain that or any other separate publication of this office, to avoid the obligation of receiving it as a present. If no small bill will suit the order at retail price, a \$5 note will pay for 10 copies—and the risk of mail conveyance, both of the money and the publications, in all cases is borne by the publisher. Ten persons may be thus supplied with the work above-mentioned, at 50 cents for each.

It would illly become the author to utter any thing in commendation of the 'Essay' as a literary production, or as to the degree of success with which the doctrines and the practical deductions therefrom have been set forth. But he may venture, after this lapse of time, and of universal acquiescence and of approval by all other persons who have examined or acted upon them, to claim that the doctrines and precepts are true; and if so, their being known is all-important to every farmer, and especially in every district of neglected calcareous manures. In all of the latter circumstances (which are still general through ex-

tensive regions in the southern Atlantic states,) we may venture to assert, that the profit, both individual and general, of every new case of the application of the doctrines and precepts referred to, will exceed more than a thousand-fold the cost of the volume containing them.

In the cheap form of the second edition (of which a very large number of copies were printed, and not many now remain on hand,) the facility of extensive circulation was the main object in view; and for that object, there was sacrificed much of the pride, and all the (possible) profit of authorship. Several thousands of copies have been distributed, and a large proportion gratuitously; and we would be pleased to dispose of all that remain on hand, also as gifts, if sure that they were sent where acceptable and valued, and where they would be of most service to the improvement of agriculture. Therefore, to all claimants on *that ground*, we shall not be rigid as to conditions or payment; for even with a smaller proportion of payments than heretofore received, we shall be content and gratified to send copies of the work to any quarter where they will be serviceable to agricultural and general interests.

ED. F. R.

PREPARATION OF MANURE.

To the Editor of the Farmers' Register.

March 7th, 1840.

I am sorry to complain of a typographical error in my communication of January, which occurs in the second line; i. e. "manifested" for maintained, or sustained, (I am not sure which, as I never keep rough copies,) but I think the latter.

I cannot blame your compositor, being too sensible of the illegibility of my hand; but do assure you, that an unwillingness to give trouble, causes me great pains in writing, (unavailing as they seem,) and often deters me from communicating with the Register. In this instance, I am only surprised at the accuracy of the piece—no other mistake occurring than the trifling one of omitting the letter *n* in an indefinite article, before a vowel. But notwithstanding my chariness of giving trouble, I am led by the occasion to give you my management of an operation in which we are now engaged, having never seen a communication on it. I mean as relates to manure. It may be worth something, at least to tyroes.

During the season of feeding and littering farm-pen stock, having accumulated in the early part of winter a considerable body of corn-stalks, I use alternately with them, straw in piles, instead of racks, which mixture promotes decomposition, and retains, better, the liquor of manure. Leaves are in the same method occasionally introduced. Manure from the floored pens of fattening hogs, littered in the same way, is advantageously hauled and scattered over the farm-pens. This being the richest made on a farm, can be better distributed on land by being thus mixed with the weaker manures; and with the same view I in-

roduce, at different times, the manure from stables.

I make it an invariable rule to turn over, with two or three-pronged dung-hoes, the whole mass of manure twice or three times during the season of making it; the advantages of which are twofold; first, the thorough admixture of the different qualities, and secondly, the encouragement given to decomposition by partial admission of air; with which motive I frequently let in the stock-hogs.

Lastly, when about to commence hauling out, the contents of the farm-pens are put into ricks with dung-hoes and pitch-forks; roads being left between for carts and wagons to drive in at one end and out at the other. The object of which is to facilitate loading, both as to convenience and lightening the manure, which loses very little strength by the operation, if ploughed under as it should be, as fast as hauled on the land. Indeed, the sudden drying of manure in this month prevents much escape of its essence by evaporation. Fire-fang is apt to occur if these large ricks remain more than one week.

RIVANNA.

It has been always a cause of regret that our friend who signs as "Rivanna," should favor the readers of the Register with so few of his always excellent and valued communications; and it will add much to the regret if our fault should make him still less communicative than heretofore. We know by report that "Rivanna" is one of the best farmers of Virginia, and there is no one whose *anonymous* communications are more desired than his. His real signature, as in all cases, would add greatly to their value. We trust, that neither "Rivanna" nor any other correspondent will again have just cause to complain of our proof-reading; and we may venture to assure him that he will not be at all justified by that excuse in keeping his pen idle.—ED. F. R.

EXTRACTS OF PRIVATE CORRESPONDENCE.

—East Tennessee, March 10th, 1840.

"Your favor of the 5th February has been received; also the last volume of the Register. Pray accept my thanks for your kind remembrance. My zeal in the silk culture is unabated. Rather higher than in my first love, notwithstanding I have some million and a half of buds which I could not sell. They are surpassingly fine, and all boxed up in tan, for the market, which did not offer. Be it so. Perhaps 'tis all the better for the culture of silk. I shall plant immediately (the ground is ploughed) twenty-five acres, (my very best wheat field.) Don Quixote, you know, gave his best grain land for books of knight errantry. My cocoonery 200 feet by 60 is going up. Four millions of eggs are in the ice-house; half of which I wish to keep back, if I can, for a second crop. My plan is, to feed so large a number of worms as will justify my employing reelers the whole year; and thus secure their permanent services. China, in my opinion, cannot surpass East Ten-

nesses in adaptation for the silk culture. The multicaulis grows as well with us as corn; and the silk-worm is so healthy that I do not think we lose 2 per cent. Every consideration appears to show that nature points to this as the silk region of the United States *par excellence*. We have no conflicting staple. We have a very dense poor white population—saying, “give us employment”—ingenious, not *ashamed* to work, and remarkably docile—more manageable than the northern population of like grade. The girls and men in my cotton factory are better hands, and more manageable, than at any factory in Maryland, and equal to those in Massachusetts. And *any number* whatever can be obtained for extremely low wages. Provisions, abundant and cheap. Again—the merchants (and that class is very numerous and influential in E. T.) have a deep interest in this business. For our currency is always at a great discount, and we are so far from market, that our heavy agricultural productions cannot sustain the transportation. Silk will be better for us than mines of gold and gems; and more than supply our want, long to be experienced, of rail roads, canals, and navigable rivers. If I could, I would make every man in this region dream of silk until the vision became reality. If I fully succeed this year the business is established. A good many are entering into it, and the present season will be the crisis of the *disorder*.” * * *

* * * “Every publication which can be relied on respecting the silk culture will be valuable to the country; for although I do not believe that it is a culture which will ever admit of profit on a large investment, yet I am satisfied, that if establishments were formed in each neighborhood for the purpose of buying cocoons and reeling the silk, the tending the worms would be found to engage advantageously the women and children every where, who are now mere consumers. In the part of the country in which I reside, Habersham county, in Georgia, many persons were engaged in a small way, in tending and feeding the worms on the native mulberry of the country, and the result was a conviction that no climate could be more favorable. The winters are steadily cold from November to March both inclusive, the thermometer varying during that time, in a northern shaded exposure, between twelve and forty; sometimes at midday going as high as fifty, and perhaps once during a winter going to zero. So that the climate is cold enough to preserve the eggs from hatching until late. Our summer heat very rarely goes above 87°, and it has been found by our experience, that no trouble need be taken to keep the atmosphere in an ordinary room in a sufficiently equable state. No trouble indeed is necessary except to keep the worms clean and well fed. The atmosphere is so dry, that there is but little snow, and I have never seen moisture even on the plaster walls of stone, where the plaster was put on the wall without the intervention of “furring.” You will I think then admit that in my section of the country, at least the women and children may raise the cocoons successfully in a domestic way.” * * *

Sparta, Ga., March 4th, 1840.

“To show you how forward the season is here, I enclose you a few leaves of the *morus multicaulis*,

taken from plants that came from cuttings planted on 15th February, 1839. Any quantity of worms can be fed here at this time, as the leaves will increase in quantity, and faster than the worms would increase in the consumption of them.

My object in sending you this information is to show you, and others, that silk can be raised in Georgia, and more than one crop in a year. My silk-worms' eggs commenced hatching on the 2d inst., and will soon all be out.

The peach blossoms made their first appearance on the 17th February, and are now falling; they were fullest on the 25th.

The largest of the leaves enclosed are 3 by 4 inches.” * * *

—5th February, 1840.

* * * “Permit me to express to you the gratification I experienced in the evident superiority of the concluding numbers of the last volume. (Not having been at home for the last four months I have not of course seen the numbers of the present volume, for which I am now sending my subscription.) I was particularly pleased, and hope instructed, by your essays on improving lands by the ploughing in of green crops, and hope that you will keep a watchful look-out for any thing which may throw farther light on that subject.

A few years ago there was much written on the subject of the Italian rye grass, as a vastly productive and very easily cultivated grass. The lamented J. Buel thought most highly of it as a productive and quick growing grass, and said that he was satisfied it would answer very well south of Pennsylvania. As it came from so warm a climate as Italy, I thought we might reasonably calculate that it would bear our hot dry summers much better than most of the foreign grasses. Induced by his representations, a friend of mine united with me in sending for some of the seed, which came up beautifully, but proved to be nothing but the English perennial rye-grass, a small dwarfish plant, exceedingly impatient of heat and drought, and of very little value. If you can give us any information on the subject of this Italian rye-grass, I have no doubt it will be acceptable to my brother farmers as well as myself. If only half of what is said of it is true, it must be far more productive than any we are acquainted with, and then its culture is so easy, requiring only 15 or 20 lbs. of seed to the acre, and lasting for many years. A few years ago there was a great deal written in your paper about the Gama-grass, and no doubt some of your readers gave it a fair experiment. I should be very glad to learn whether it was really valuable, or a mere humbug; and should be obliged for the same information in reference to the Guinea grass, and more especially if the latter can be made use of as a grazing grass in this country. I have a few of the plants, but they are in a garden, where of course there is little opportunity of testing their value. They stand our winters well, and produce a great quantity of vegetable matter, which horses, constantly stabled, eat with great avidity. But it certainly does not grow with any thing like the luxuriance with which it is said to do in Jamaica, and does not seem to recover quickly from the bite of animals.

I hope you will excuse this liberty, as I have been a subscriber to your valuable paper from its

commencement, and this is the first time I have troubled you with the reading of a letter. . . . Wishing you all success in your truly useful effort to raise the character of our agricultural interests, I must now bid you farewell, with the assurance that I remain, &c."

We are unable to give any information as to the Italian rye grass ; or as to the Guinea grass, except that we have not heard contradicted the high character which was given to it by several of our correspondents in some of the early parts of the Farmers' Register. The Gama grass seems to have been lost sight of latterly ; and we have never known any person to turn its growth to profit. We will thank any one better informed to answer any of these inquiries.

If our respected correspondent owed us any apology in regard to his letter, it was not for writing it, but because of *not* having written before, and for publication.—ED. F. R.

A SIMPLE AND CHEAP SILK REEL.

To the Editor of the Farmers' Register.

Brunswick, March 19, 1840.

You will please accept of the reel I have ordered you ; it is such as I use in reeling silk. I have never been able to see any advantage the Piedmontese, or any other kind, has over it. The model I purchased in Hartford, Connecticut, for \$5, and it is there called Dale's reel. I made it more simple by dispensing with two whirls which served to give it additional motion, which was not necessary. I claim no credit for any improvement, and my neighbor, Hartwell Hill, and a faithful mechanic, is the maker of the one sent to you. You can readily see it is simple and cheap. My only object is to let the public know that silk reels can be made for a mere trifle, which I believe to be equal to any now in use, and no patent right on them.

If you think the public can be benefited in any way by inserting the above in the Register, you can do so. I expect to draw upon me the censure of some who hold patents of other reels; but I don't fear a comparison of this reel with any I have seen; not meaning in appearance, but as to performance. Any common carpenter can make the reel, and there being no patent right on them to puff them off, has kept them in the back ground. You can see from the numbers how to put the parts together. The band must be put on so as not to rub on any thing but the two whirle.

THOMAS HICKS.

The above letter was received just in time to be included in the last sheet of this number, and two late for us to see the reel put together. We value the present the more as coming from one of the earliest, and now one of the most experienced of all the new silk-culturists of Virginia, and who has had enough practice to succeed well in reeling silk, as well as in feeding worms, even with such humble machinery, and with mechanics and reel-

ers totally ignorant when first employed. The opinions of Mr. Hicks, being derived from practice, are especially entitled to respect, and his communications for this journal will always be very acceptable.

We shall best second the liberal and public-spirited intentions of Mr. Hicks, by having the reel, which he has sent to us, put together and kept for some months for examination in this town. It is proper to state that it agrees with the Piedmontese reel in one respect (as all reels ought) that of making the hanks of the same, or standard size.—ED. F. R.

**FURTHER REMARKS ON THE ERRORS OF THE
TRANSLATORS OF DANDOLO.**

Our advertisement on the cover of the January No., inquiring for a copy of the original work of Count Dandolo, (' *Dell'Arte di governare i Bachi da Seta,*') has served to obtain it; an end which all of our sundry previous attempts, made both in this country and in Europe, had failed to reach. The copy obtained is of the fourth Milan edition, which is later than any we had seen referred to, or heard of, before. For the gift of this long sought and much valued volume, we are indebted to the kindness of Robert Chisholm, esq., of South Carolina. Before obtaining this, we had received the Florentine abridgment of Dandolo's first edition, which was acknowledged on a previous page; and we had also been offered by Peter Hulme and John Vaughan, esqs., of Philadelphia, a copy of one of the early and therefore less perfect editions, the loan of which is now rendered unnecessary. To all of these gentlemen, we feel as much obliged for the kindness of their intentions and their offers, as if they had been fully availed of.

A very slight examination of this volume, and comparing it with the English translation, (which, however, is of an earlier and less full edition,) served to confirm our previous opinion, that all our known translations, and the American treatises drawn from them, are grossly incorrect in the statistics and arithmetical statements—and that such errors are even more generally pervading than we had before suspected. As to the particular error which we had ventured to expose in the last number, (at p. 102,) even before seeing the original work, it appears that we have not presumed too much. The spaces are expressly stated by Dandolo in *square braccia*, which his French translator foolishly changed to *feet*, (according to the supposed equality of lineal measures,) and thereby reduced the true spaces nearly one-half. We only erred slightly in one respect, (by paying too much respect to Murray's authority,) which was in

making the Milanese *braccio* too small, and by so doing, we somewhat abated in appearance the real enormity of the errors made by the translators and their copyists. The Milanese *braccio*, instead of being about 22 English or American inches, is, in truth, 23.4257, or nearly twenty-three and a half inches. This further correction being made, serves still more to increase the variation of the translators from the author's words as well as meaning.

But though this one radical and all-pervading mistake is the greatest and the most ludicrously absurd of all, there are almost as many other mis-translations and incorrect amounts, as there are quantities named in the work. The reader may form some idea of the detriment thereby caused to a treatise of which the great value consisted in careful and accurate experiments and practical operations, of which all the quantities have been changed, and most of them greatly changed, in all the many existing versions. If all the sums and numbers of a treasury report (for example) were increased or decreased from 10 to 75 per cent. by typographical errors, or if a work on practical mensuration had every arithmetical problem worked wrong, and showing wrong results, their value would thereby be scarcely more injuriously affected, than is Dandolo's admirable work by the mistakes of his translators. A worse name than "mistake," however, is deserved especially by the compiler of the Congress 'Manual,' in as much as he stated that, "having the use of the original work in Italian, as well as the French translation from which the English version was made, the errors of the latter were corrected—" an engagement which his performance utterly falsified in every one of the numerous particulars; and it would seem that either his ignorance, or his gross inattention, prevented his even suspecting the wide variance between the original which he pretended to consult, and the translation from which he really copied his work—which, like most other government jobs, was probably as well paid for, as it was imperfectly and fraudulently executed.

The error above named in the *braccio*'s lineal measure affects all of the many dimensions stated of the laboratories, and their shelves, passages, and all other parts. The weights are still more erroneously rendered. The quantities of leaves directed to be given in every day throughout the feeding time, are changed by the translator from Milanese to English pounds, by a very simple rule. The changes are made by merely adding 50 per cent. to the Milanese weights. But unluckily the simplicity of the rule is its sole recommendation, as it is altogether incorrect. The Mi-

lanese great pound (*peso grosso*,) of 28 ounces, is equal to 11768.425 English grains, and the English pound avoirdupois is 7000 grains. Therefore the Milanese pound is equal to 26.90 ounces avoirdupois, instead of 24 ounces, as is the ratio of increase made throughout the English translation.

If mistakes and errors are indeed to be found to but half the extent here alleged, is it not manifest that a new and correct translation of Dandolo is greatly required? Or rather, does it not prove that, as to its most important facts, Dandolo's has been almost a "sealed book" to all others than his countrymen? It is indeed a most striking proof of the value of this great work, that, notwithstanding the numerous arithmetical errors of all the versions, Dandolo's authority (falsely as it is cited,) should yet continue to be held in the highest estimation!

It was easy enough to ascertain, as we had done, in part, before even seeing the original, that the numbers and quantities of the translations are wrong; but it was far more difficult to determine what would be right, and possibly we may not have avoided falling into some new mistakes, in escaping from the old ones. But we shall offer the grounds of our alterations; and if any, or all are wrong, the means will thus be furnished to the better informed to correct all such errors. If the translators had in like manner submitted their authorities, their statements would not have been deceptions, and might have been useful, even if proved to be erroneous. We invite, as well as offer the means for, the correction of our mistakes, if any are here made.

A concise statement will be offered of the errors of quantity in the translations, not so much however of individual cases, as of whole classes.

First, and the most erroneous, the substitution of the *square braccio* of Dandolo by the *supposed* equivalents in *square feet*, has already been sufficiently exposed, in the last number.

Next, as to the length of the *braccio*; in regard to which the difficulty of correction is not the deficiency, but the superabundance of authorities, and their want of agreement. The common weights and measures of Italy, of the same denominations, are different in every two towns; and even of the same city, different authors of reputation report different values of the same denominations of common weights and measures. The uncertainty thence arising is so great, that it is a matter of great difficulty for a foreigner to understand the value of any particular denomination. Nor would it have been discreditable to the French or the English translator of Dandolo, if he, by following some one author (and referring to the authority so preferred,) had been led into

error. But many and various as are the authorities to serve as guides, it does not appear, to our understanding, that the English translator of Dandolo has truly followed any one of them; or if he has followed one, no intimation is given of which, nor of the grounds of preference.

It would be foreign to our direct purpose, though serving to show more fully the general confusion and difficulty of the subject, to state the various values of the braccio and of the pound in different towns of Italy. The braccio of Milan alone, (the measure of course referred to by Dandolo,) is valued as follows, by different high authorities:

According to Cavallo, in a table in Rees' Cyclopædia, (art. "Measures,") and also in Edinburgh Encyclopædia, the Milanese braccio is equal to 1.725 English feet, or 20.700 inches.

According to Murray (in Brewster's Journal of Science, and Edin. Ency.) it is "about 22 inches."

According to the table in Dandolo's 4th edition (page 311,) it is equal to 5.95 *decimetres*, making 23.4257 inches.

There are two Milanese *pounds* used in commerce. The heavy pound (*peso grosso*) is of 28 ounces, (of which the value will be presently also stated,) and the light pound, (*peso sottile*), of 12 oz. according to Dandolo, but of 8 oz. according to Rees' Cyclopædia. By the table of comparative weights given in the original of Dandolo's work, as well as other parts, (and as also stated in the Florentine abridgment,) it is manifest that the heavy pound is referred to in all the instructions, and statements of quantities. But this could not be known from the English or any known translation. For raw silk is one of the commodities, (and a very large and important one in Lombardy,) which is always weighed and sold by the light pound; and therefore a reader who was informed as to that fact, might have very reasonably (though incorrectly) inferred, that the weights of the kindred articles of cocoons, silk-worms, their eggs, and perhaps all other weights named in connexion, in the same treatise and by the same writer, were also reckoned by the same weight, the light pound. This difficulty would be still more increased by the following attempt at explanation in Rees' Cyclopædia. "At Genoa, Florence, Leghorn and Milan, the pound for weighing gold and silver is divided into 8 oz., and the ounce into 24 *danari*, or 576 grains. The commercial weight in most of the above places is the same for light goods as for gold and silver, and is called *peso sottile*; but a heavier weight is used for coarse commodities, and is called *peso grosso*."

Having decided, however, that the pound referred to by Dandolo is the "*libbra grossa Milanese*" of 28 ounces, let us see the authorities for its value.

According to the tables in Rees' Cyclopædia, 1 Milanese pound, *peso grosso*, is equal to 11592 English grains.

According to table of Dandolo, the same, or 1 "*libbra grossa Milanese*" is 0.7625 kilogrammes, [or 11768.425 English grains.]

The Milanese ounce is 2.7232 *decagrammes*, [or 420.2986 English grains.]

Of the several and variant values of the common lineal measure and common weights of Milan, we receive as correct those which are according to the table in the 4th edition of Dandolo's work, as quoted above. This table stands as a part of the regular work, and may be inferred to be from Dandolo's pen as much as any other page. But should it be even an addition from another hand, yet being published in Milan, and designed particularly for this work, and the values being all exactly stated in the new French and new Italian equivalents, it would be very strange indeed if a table thus prepared, for such a purpose, should not be correct.* Yet this table gives different, and in some cases very different values from any other authority. By adopting these corrections, and applying them to every quantity stated by Dandolo, it will be seen that his allowances both of food and space for silk-worms were considerably greater than as stated in any known version of his instructions.

It is unnecessary to extend these strictures and corrections farther than these three great classes of errors, each and every particular quantity named of each being incorrectly rendered by the translator and his followers. Neither have we extended our examination to every particular quantity of other kinds named. But if a cursory and partial glance and comparison may serve as grounds for an opinion, we may venture to affirm that in all other quantities stated, whether of land, or of money, or in the smaller measures of lines, inches, or ounces, there is as much departure from the author's meaning as in the more general errors specified. In short, if there is even a single quantity correctly stated, among all designed to be given by the translators, we have not observed such an exception to their general, if not universal rule of translation.

A few particular cases only of gross errors will be stated which do not come under the above general classes.

* As this table purposes to give the values of Milanese weights and measures in those of the "new Italian and French weights and measures," it may be inferred that the admirable metrical system of France was established also in the kingdom of Italy, when the latter was under French rule. If so, it makes the authority of this table indisputable.

The Milanese square land measure *pertica*, (perch,) is the one used by Dandolo, and in various passages of his estimates. This measure (according to the table of Dandolo) is of a *hectare* 0.065452; or is equal to 782.6635 English square yards, or between one-sixth and one-fifth of an English acre. The value of this measure is given in the English translation in three very different quantities, and all of them wrong. At page 287 of the translation, the *pertica* of the original is made "acre"; at page 358, the same quantity and denomination is given as only ten square feet, and in several other places, the *pertica* is simply rendered as "perch" in English, which is equal to 30½ square yards.

At page 352 of the translation "the 2928 square feet" named, according to the original should have been "2928 square braccia," or nearly four times the extent in square measure.

The Milanese coin *lira* of the original (the money value always used) is in most cases stated as "*franc*" by the translator, though other money values are stated by the *lira*, as in the original. Yet so far from these values being equal, the *lira* is very little more than three-fourths of the *franc*.

Such are the elements of the long and elaborate (and originally valuable) estimates of cost and product of silk-culture, as presented by the translators of Dandolo!—ED. F. R.

CORRECTION OF ERRATA.

In the communication of John A. Selden, esq. in the January number, the following typographical errors, all in page 3, need correction.

Column 1, line 2 from bottom, for "*time* my corn crop," read "*house* my corn crop."

Column 2, line 27 from top, for "insufficient," read "inefficient."

Column 2, line 13 from bottom, the words "this corn" should be transposed, so that the passage shall be read, "I lost corn this season," &c.

Column 2, line 10 from bottom, for "*successful* spring cultivations" read "*successive*," &c.

Column 2, line 9 from bottom, the words "and is" should be omitted.

IMPROVEMENT OF COTTON LANDS BY FLOWING WITH BRACKISH WATER.

Charleston, 19th February, 1840.

From the Southern Cabinet.

Dear Sir,—In compliance with your request, I have taken some pains to possess myself of the facts connected with the experiment of flowing cotton lands with salt or brackish water. They are as follows:—

In 1838, some marsh land, which had been

nearly worn out by repeated crops of cotton, was planted in oats. In the autumn of that year, the stubble was listed in, together with a considerable growth of weeds, which had succeeded the oats. The list was ploughed over, and kept for a fortnight nearly covered with brackish water. The land was bedded as usual and produced a very fine crop.

I am disposed to attribute the success of the experiment mainly to the flowing, because, though the whole treatment was such as to warrant an expectation of improved production, it was scarcely sufficient to account for a growth equal to that on perfectly new land, which was the case in the present instance. Salt has been used with success for manuring cotton, and I see no reason why a moderate flow of salt water should not have the same effect.

Yours, with respect,

A CORRESPONDENT.

TO THAW FROZEN PUMPS.

To the Editor of the Farmers' Register.

Jackson, Ten., Feb. 29th, 1840.

I noticed, in the January number of the Register, that a person, who signs himself "Mountaineer," inquires "how the freezing of pumps can be obviated?" If he will put into the pump a quantity of salt—if the weather be not as low as zero—it will soon dissolve the ice. Brine will not freeze until the weather is at zero; hence the solution of the ice by the salt when above that point of temperature.

MECHANIC.

MILLET.

From the Southern Cultivator.

We have been requested to give what we know and could collect from others on the culture of millet—with which we comply cheerfully. Millet is the most productive crop perhaps that can be put in the ground, and yields grain and hay of excellent quality. In some instances it has been supposed to yield four tons of hay per acre when cut and cured; and stock devour it with greediness—its value consists not only in the blades, but in the stalks, which are frequently four and five feet long, very succulent, and are eaten entirely up by stock. Henry Turney, esq. of Maury, is familiar with its growth and culture—he considers it a valuable article for provender, and thinks it best to sow it about the middle of May; others sow the first of April. This may be left at the option of the cultivator. Tolerable fresh land and strong is best suited to its growth. The ground should be well ploughed and harrowed, the seed sown and then harrowed in, and left in a smooth condition, in order to facilitate the cutting, as millet is a crop that has to be mowed. A peck of seed is sometimes sown to an acre—though a gallon per acre we think is most common. It has been remarked by many, that nearly every kind of fowls delight to feed on the grain of millet, and of course must fatten on it. It would be valuable no doubt, for all kinds of stock, and recommends itself to the attention of farmers.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

Supplies of produce pour into our markets from the interior, in quantities great, and at prices low, almost beyond precedent. Already about 1350,000 bales cotton have been received at the ports of shipment: nearly equal to the entire receipts of last year. Quotations of prices in the large markets at the south and west range from 4 to 9 cents; the largest sales are between 6 and 8 cents. The number of vessels in those ports being inadequate to the demand created by this, and other abundant crops, the rate of freight to Europe on cotton has advanced to 2 to 3 cents per pound.

The supplies of flour, are also very large, and will be greatly increased when the Erie canal shall be re-opened some weeks hence. The price of flour has declined to \$4½ to \$4¾, and the exportation of it is checked by want of vessels. The duty in England has advanced to 13 shillings sterling per bbl., which, with the present high rate of freight, makes the charges equal to the first cost. Thus the wholesome bread which we could furnish and which would tend to extinguish our debts in England, and enable us to import her manufactures, is denied to her mechanics and workmen, who must eat musty flour for the benefit of her land-owners.

Indian corn sells at 45 to 50 cents per bushel. The tobacco inspections have been thronged, until lately. Supplies are less abundant just now, owing to the weather and to farming operations. Prices range from \$2½ to \$6½ per 100, and occasionally higher for a fine or fancy sample—general sales between \$3 and \$6. Scarcely any of the best quality is yet brought to market.

Low as cotton and provisions are, the manufacturing establishments at the north are said to be doing less work than usual. The scarcity of money, destruction of credit, and derangement of exchanges, have paleied our trade, and all interests feel the blighting effects.

Bank paper, based in some of the states on any thing but sound capital, has become in such cases almost worthless, and the rates of discount as quoted embrace a range from 5 to 95 per cent. The highest rate is in Mississippi, where, with abundant crops, an almost general bankruptcy prevails.

The rates of exchange are improving where the banks are sound, and the difference between New York and the southern states is now reduced to 5 to 7 per cent. Exchange on London is quoted in New York, 8 per cent., in Virginia, 14 per cent. premium. X.

March 24.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

LIME AND LIME BURNING.

From Prof. Ducatel's Geological Report of 1839.

A very striking experiment, that speaks volumes of encouragement to those who still hesitate in the use of lime, is furnished by the Hon. Outerbridge Horsey, a part of whose farm, situated at the foot of the south mountain, on the edge of what is termed "the Maryland tract," consists of a very thin silicious soil. It is this, of two pieces of ground, both of the same geological character and nearly in equal arable condition, one was limed with fifty bushels to the acre, the other was well manured, without lime, and both planted in corn. The limed portion, previous to the operation, was remarkably poor, yielding at most two barrels to the acre. It promised in the month of August, to the eyes of some experienced farmers, to yield to the acre eight barrels of corn, which to all appearances was one third better than on the manured portion. But besides the prejudice that exists against this use of lime, as regards the incapacity of certain soils to receive any benefit from it, it is most generally objected to as too expensive; whereas in truth it is, taking all circumstances together, the cheapest as well as the most effectual means of improving all kinds of soil, which assertion will, I trust, be manifest by these two considerations, namely, that it is the surest and most permanent. If judiciously employed, the directions being simple, as will presently appear, the expenditure of capital in the first year cannot fail to be at least repaid by the additional product of the next, and nine times out of ten will supply the means of extending its further use in future years. Judgment and reflection undoubtedly must accompany this as well as every other scheme of improvement that could possibly be devised for any purposes.

Having taken especial pains to inquire minutely into the subject, referring not only to the results obtained by experience, but to the cause that may have produced these results, I hazard the following suggestions to the farmers of Frederick county, and the recommendation applies to all other portions of the state. Get lime, at almost any expense, and apply it according to the nature of the soil as is herewith directed. If the soil is naturally a good one, and under good cultivation, it is advisable to apply at once the whole quantity of lime which may be judged necessary permanently to improve it, and this quantity on such soils need not exceed one hundred and fifty bushels. Should it be impracticable or inconvenient to procure in the same year the whole quantity, from fifteen to seventy-five bushels may be first applied, and the remainder two years afterwards, after the first cutting of the clover. These directions apply to wheat land, on which it appears preferable to turn in the vegetable matter first, then apply the lime, to be harrowed in subsequently. On corn lands the method that has been crowned with the best success, is that pursued by one of the most thrifty farmers of Carroll county, Mr. Jacob Schriver, which is to mix the lime in the soil with stable manure. In this way, he informs me that he has

obtained very heavy crops upon poor land with only from forty to fifty bushels of lime. In general, for unimproved lands, it is always better to turn the lime in with stable manure, and when not so provided, with any vegetable matter that may lie on the soil. A good plan is to turn the lime in with the sod, sow buckwheat, and when in blossom return it to the soil, furnishing in this way vegetable matter for the lime to act upon. In this latter case, the returns, though certain, are not so speedily to be expected. Those farmers who burn their own lime, should not neglect to use the refuse of their kilns in making composts with alternate layers of it, and of whatever vegetable or animal matter they can bring together. These, when properly mixed up, and comminuted, are to be used as ordinary manures. The foregoing directions apply to all sorts of soil, whether they be on limestone lands, red lands, chestnut lands, or any kind of lands, whatever be their color, texture, or other physical characters, provided there be soil enough to support any sort of vegetation.

I have in former reports given my theory of the action of lime, and although farmers are more immediately interested in the results of its application, they cannot fail to employ it more judiciously, as well as other manures, when they understand the reciprocal action that takes place between these and the plants which they wish to cultivate. I shall, therefore, introduce here a few simple notions of vegetable physiology, and repeat again what I conceive to be the mode of operation of lime. Every one knows that plants have not the power of creating new elements, which they at most can assimilate and elaborate so as to form new compounds out of those derived from the earth, air and water in which they live. Accordingly, the result of a chemical analysis shows that all the earthy and saline matters contained in them are traceable to the earth; whilst by their destructive distillations, they are found to yield gases, that form the elementary constituents of air and water. The principal solid constituent of vegetables is carbon, or charcoal, which vegetable physiologists assert they derive in the first place from the carbonic acid gas of the atmosphere, and from the fermentation of the animal and vegetable substances that during their progress of decomposition in the soil also yield this gas, and is supposed to be either decomposed by the leaves of vegetables, or absorbed by their roots when in a state of aqueous solution. It is found that when a plant is allowed to grow under a glass receiver, containing a mixed atmosphere of carbonic acid gas and oxygen, the former gas is gradually absorbed, and nothing but pure oxygen remains, and this process of vegetable decomposition goes on more rapidly under the influence of the solar beams, for during the night the reverse takes place, though the quantity of carbonic gas which they emit is trifling, compared with that taken up in the day. Thus plants are constantly removing from the atmosphere a gas known to be deleterious to animal life, though necessary to themselves, and

replacing it by one essential to both man and brutes, exhibiting a most admirable provision of nature, to which we must refer that healthfulness of a country life, which, combined with active exercise and the enjoyment of rural sports, makes the mere consciousness of existence a pleasurable sensation. It is also an admitted opinion among vegetable physiologists, that plants have the property of secreting from the soil that sort of food which is most congenial to their own wants, whilst they, at the same time, excrete, or throw off, that which is best suited for their own growths. If this doctrine could be well established by experimental results, the pursuit of the agriculturist would become a science founded upon an immutable basis, and a consistent system of rotation in crops would secure to him a perpetual recurrence of good crops. But it must be acknowledged that this is the most obscure department of vegetable physiology.

As to the action of lime, or rather carbonate of lime, I can conceive it to operate in three important ways. 1st, As a neutralizer of any acidity of the soil which renders it prone to throw out ascescent growths, such as sorrel, pines, briars, &c., that interfere with the production of plants that afford farinaceous seeds, in which case it may be supposed, by a new combination, to give out its carbon to the growing vegetable. 2d, As an amender of soils; since it undoubtedly contributes to stiffen a loose soil, and gives body and consistency to a porous and sandy one, thereby improving its physical condition. And 3d, As a septic, or decomposer of the vegetable matters that may have existed in, or been applied to a soil, reducing them into soluble compounds, fitted to the nourishment of vegetable life. These I conceive to be the most immediate benefits derived from the application of lime; but it would seem to act also beneficially as an absorbent of moisture, for it has been found to protect soils from the pernicious effects of a drought, and when used for making compost, its utility and action are as easily understood as explained. When applied in alternate layers, with stable manure, or vegetable and animal matters of any kind, a powerful fermentation takes place, which gives rise to the formation of a compound called ammonia, and to the production of carbonic acid. A re-action soon takes place between these two substances, and a carbonate of ammonia, is thus formed, together with numerous other salts; and the whole mass is converted into a powerful manure. Lime is further serviceable to the farmer, by enabling him to destroy the insects and the seeds of weeds that frequently accumulate in the barn yard manure; for by applying it in its caustic state in alternate layers with the manure, sufficient heat is generated to destroy them effectually; and this operation produces, moreover, a variety of soluble salts, that increase the action of the manure, if it be used before they have been removed by rain. There is another combination of lime which is very valuable to the agriculturist; it is that in which it exists in bones, that are principally composed of phosphate of lime. Most extraordinary results have been obtained by the use of ground bones as a top-dressing, especially on buckwheat crops.

It follows from the above consideration, that it is a matter of much importance to the Maryland farmers, to obtain lime at as cheap a rate as possible.

Desirous of serving them in this way, I have turned my attention to the subject of lime-burning; and after reflecting upon the theory of the operation, and consulting the practice of the most experienced lime-burners in the state, I think I am enabled to give some simple directions, the observance of which will have the desired effect.

In the first place, as regards the construction of the kiln, I recommend that it should be in the shape of a truncated egg at both extremities, with the but-end downwards, contracting the upper extremity, so as to make it act in the manner of a reverberatory furnace. Its shape should be very symmetrical, with a view of securing a uniform draft in all parts; and it should be built with solidity, of the most refractory material, with an elevation of about twenty-two feet, and a bulge at its greatest diameter of eleven feet. A kiln of the size will burn from 1,000 to 1,200 bushels of lime.

Next, in conducting the operation, which, according to the present practice, lasts at the least three days and three nights, all lime-burners agree that on the morning of the third day, their kilns become choked up by something which prevents the formation of fresh lime, and during the whole of which they are burning wood apparently to no purpose. The cause of this choking, when the kiln, in popular language, is said by some to be "set," and by others "glued," is owing to the accumulation of that peculiar gas which it is the object of the burning to separate from the lime, in order to bring it into a pulverulent state. This carbonic acid gas, as it is termed, is very heavy, so that where it has thus accumulated, it forms a dense atmosphere, binding round each unburnt portion of stone, and thereby impeding the progress of its calcination. It is true that by urging the fire, the gas finally becomes so rarefied as to be expelled; but this is the unprofitable part of the labor, which may be avoided by simply throwing some water over the kiln. The water immediately absorbs the gas, the kiln is relieved, and the calcination proceeds as rapidly as in the first stages of the progress. In corroboration of this view, I have found that it agrees with the experience of several observant lime-burners, one of whom informed me, that on an occasion, when his kiln was in the condition above described, his hands becoming impatient at the delay of their expected results, bethought themselves of ascending to the top of the kiln and fanning it with their hats, and were surprised to find their operations, by this simple act, greatly hastened. The effect was evidently, in this case, to remove by ventilation the dense atmosphere of gas, as previously stated, that by its pressure prevented calcination of the lime-stone. Another tells me that under similar circumstances, the same phenomenon was produced by the timely occurrence of a shower of rain.

If our lime-burners then will adopt the plan of kiln described above, and resort to the simple device just suggested for expediting their operations, I have not the least doubt that they will find in it a saving of one-third of their time, labor and fuel; and by so doing, they will be enabled to afford this most invaluable material at one-third less than its present cost, putting it thus within the means of a much greater number of farmers, to reap the benefits to be derived from its use.

ON CATTLE. BY LEWIS SANDERS. (COMMUNICATION TO THE KENTUCKY AGRICULTURAL SOCIETY.)

From the Franklin Farmer.

At no time within my recollection, has the public been so much excited and seemingly interested on the subject of improving the breed of cattle as at the present. Frequent applications are made to me from different quarters, for my opinion of the various breeds, best crosses, &c. &c. Have often given my views, such as entertained at the time—those opinions may have differed from what I now hold—the expression of opinions by those having experience on any branch of business, will lead to discussion, from which truth may be elicited.

The general characteristic of the cattle of the United States, is the same as the common cattle of Devonshire, and adjoining counties of Dorsetshire and Somersetshire in England, from whence, I think, they were derived. Plymouth, a considerable seaport, lies in the former county, it was the last port for vessels to touch at, bringing out the first settlers of the colonies, and the most convenient one for taking on board such live stock and supplies generally, as would be thought useful to the settlers of a new country.

I have observed the cattle of the New England States, of New York, New Jersey, Pennsylvania, Maryland and Virginia, and they seem to have had one common origin. The first settlers of Kentucky brought with them the blooded horse and the common cattle of their native state, (Virginia.)

The first effort to improve the breed of cattle in this country that we have any account of, was made by Mr. Matthew Patton, then living on the South branch of the Potomac in Virginia. Mr. Patton, with a numerous family, removed to Kentucky, bringing with them their fine cattle, (a very full and interesting account of this valuable stock has been given by Mr. Benj. Harrison, a grandson of Mr. P's. and published in the Franklin Farmer, to which reference is made.)

This breed was held in great estimation, and was generally spread through the country. Captain Wm. Smith, was a very successful breeder, immediately after Mr. Patton's time. Up to the year 1817, all the English cattle in Kentucky, were derived from the Patton stock, and from Miller's stock; Captain Smith's was made up from them. Soon after the late war, I imported from England the stock, known as the importation of 1817—in all twelve head—four short horned bulls, four short-horned cows two long-horned bulls and two long-horned cows. One of the short horned cows died in Maryland, and one of the short-horned bulls was sold to Gen. T. Fletcher, of Bath county, where he died, having greatly improved the general's and his neighbors' stock. Another short horn bull was taken to the southern part of the state by Mr. Tegarden, and sold by him to the shakers, who took him to the Wabash country, leaving in the neighborhood of Lexington, *Tecumseh* and *San Martin* bulls—and Mrs. Motte the *Durham* cow and the *Teesewater* cow; from these five animals (short horns) have mainly sprung the stock of 1817. Mr. Clay imported at the same time a bull, a cow and heifer of the Herefordshire breed. Mr. Prentiss imported two short-horned bulls the next winter.

I continued to breed from this importation for several years, and after twelve or thirteen years, could not discover any improvement in the young stock—seemed to be rather a decline, the impression was made, that we had bred too long in the same family. In 1831, I procured a bull and three cows from Col. Powell's celebrated stock—crossing these with the stock of 1817 was highly beneficial, which has been continued with singular advantage. In 1833 all my stock went into the possession of my son. About this time, Mr. David Sutton imported several of the improved short horned Durhams. Then the Ohio company imported a number from England, and subsequently numerous importations have been made by spirited individuals of Kentucky, and we now have an abundant supply of the improved short-horned Durham, the greatest favorites at this time.

"All things in nature are destructible." There is nothing permanent. Animate and inanimate nature, like the moon, is constantly changing, this well applies to the breeding of domestic animals. When a good breed has been obtained, the great difficulty is to keep it good; to prevent deterioration calls into requisition all the talents and abilities of the breeder.

No people with whom we have intercourse, have given so much attention to the breeding of domestic animals as the English. Within a less period than a hundred years the weight of their beef cattle, and of their sheep for mutton, has been more than doubled. The first breeder of note in that country, that undertook to improve the breed of cattle was Mr. Bakewell. Sixty or seventy years ago, he commenced his improvement, selecting for that purpose the long-horns, with his contemporaries Mr. Princep, Mr. Fowler, and Mr. Munday, this breed was brought to a high state of excellence, and there held in the greatest estimation. So much so, that Mr. Princep refused 500 guineas for a two year old bull!—he was offered one hundred pounds each (\$485) for twenty dairy cows, and refused to let his best bull go to his neighbors' cows for thirty guineas the cow—a four year old steer, of Mr. P's. weighed 3400 pounds besides the rough fat.

At this period (1798) the circulating medium was gold. Mr. Fowler refused 500 guineas for ten bull calves, (near about the time that *Hubback*, then a bull calf, was bought for eight pounds;) his bulls were let out for the season from the first of April to the first of August, from sixty to eighty pounds each.

Notwithstanding the great value and importance of this breed, brought to such a high state of excellence and perfection, with so much care and expense, it was not kept up, but suffered to run out, almost to disappear.

About the time that the long-horns were in the greatest favor, commenced the improvements in the short-horn breed. Skillful breeders, with C. Collings at their head, brought this breed to a high state of perfection, as evinced by the enormous prices obtained for his stock in 1810, viz.; Comet, six years old, one thousand guineas; Lady, fourteen years old, two hundred and six guineas. Countess, out of Lady, nine years old, four hundred guineas, &c. &c. The Durham Ox, the wonder of the age, was sold in 1801, for two thousand pounds (\$9,700) he was taken about as a show.

At this time the circulating medium was paper,

the Bank of England suspended cash payments in 1797 and did not resume for many years afterwards. Compare relatively, the value of money, when the long-horns were most in favor, with its value, when the short-horns were, and it will show that the long-horns were, nearly, if not equal, in value to the others.

The decided preference given to the short-horns at the commencement of the present century, induced breeders to seek out that blood; and they have continued up to this time, with great particularity, running back to *Favorite* (the sire of *Comet* and of the Durham ox *Foljambe*), and others to the *Studley bull*, the origin of the race. We have no evidence that any breeder of note (except C. Collings,) attempted to introduce foreign blood with the short-horns, which is quite surprising, as he was singularly successful. The grandson of Bolingbroke was also the grandson of a common *Muley cow*—this grandson of Bolingbroke was the sire of the splendid old cow *Lady*, whose produce brought more money, than did the produce of any of his thorough bred cows, at this great public sale in 1810.

From the state of facts before us, the mutability of the various breeds is evident. That splendid, noble race, the long-horns, commanding the admiration of all that ever saw them, reared with so much care and assiduity by Mr. Bakewell, (the most eminent breeder of any age,) have become almost extinct. In our own country, that large and valuable breed, the Patton stock, after engrossing the attention of breeders for twenty-five years, have entirely disappeared. Their immediate successors, the importation of 1817, that have added countless wealth to the state, and at one time thought to be superior to any other breed, (as evidenced by their carrying off the premiums from the improved short-horns at several cattle shows at Lexington,) are following in their wake—Mr. Clay's celebrated *Herefords* (at one time the favorites at Smithfield) also imported in 1817, have vanished, not even a half blood to be found. There is not a full blooded long-horn remaining, within my knowledge, descended from the four animals imported of that blood in 1817. The breed now attracting attention, the short-horned Durhams, the white and roan cattle, are of great intrinsic value—their capacity to take on fat, and being ripe, at an early age, has deservedly led to this preference. But their popularity in England has induced breeders to keep up the race, running too long back in the same line of ancestry, together, that all the young ones, good, bad and indifferent, are either sold or kept for breeders, or from some other cause, this breed is more delicate in constitution, more impotency in the males and barrenness in the female, and subject to early death, than any breed that I have ever handled. Their great value cannot now be questioned, but to secure it is a point to be well considered; crossing with remote blood I deem indispensable. If we could bring to bear such utilities as were possessed and practised by Mr. Bakewell and Mr. C. Collings, it could be easily effected. I think that the climate of Kentucky is better suited to cattle, than that of England or of any other country that I have any knowledge of—our grasses and hay are not so good, but our corn crop, the cut-up corn and fodder, is so much superior for winter feed to any thing that England can produce, that the balance is greatly in our favor.

We now possess the *material*; apply the right sort of talent and proper judgment, and Kentucky can, in a few years, produce a better breed of cattle than has ever been seen in England or any other country. The cattle of Kentucky are free from disease. An experienced and intelligent feeder of the vicinity of Chillicothe, informed me that we would pay five per cent. more for Kentucky bullocks than he would for Ohio bred bullocks. From experience in the business, he was of the opinion there was fully that difference on account of the greater mortality on the part of the Ohio cattle. This will apply with equal force to the states of Indiana and Illinois.*

To improve the breed of cattle of a neighborhood, or upon a single farm, in the shortest time with the least cost, is the great *desideratum*. New beginners should commence with such cows as they may chance to own, sell or otherwise dispose of the ill-shaped, coarse and old ones. A prejudice exists against black cows; it is best to yield to it, and part with them also; retain the young and well-formed females; if good and well bred so much the better. The *bull* is the important instrument whereby the improvement is effected. Select a good young bull, having due regard to the blood of the cow he is to go to; the more remote of kin the better. Let him be from one to three years old; he can serve from fifty to sixty cows, from the first of April to the 1st of September, the best time for a bull to be with the cows; after getting two sets of calves, sell the bull. If he has been well kept, he will fetch his cost or more; then produce a bull of different blood from the last, and suitable for the young stock. After breeding to this bull two seasons, sell him and buy another, and so on progressively. Pursuing this method, the whole stock of a country may be speedily changed from an inferior to a very superior race, without any expense or cost whatever, except the risk of the life of the bull, and the interest on his cost; by re-investing the money, it will not be lost, unless the animal dies. Carry out this system, and benefit must be the result, and in proportion to the care and ability bestowed on the subject. A neighborhood now selling one hundred bullocks a year of the common breed, loses two thousand dollars on that number, by not breeding to a full blooded bull, and so in proportion of a greater or less number; a feeder will pay ten dollars more, for a two year old half-blooded steer than he will be willing to give for a three year old of the common breed—a year's keep, risk of life and interest of money, is worth ten dollars. Ten dollars received, and ten dollars saved, is twenty dollars.

A stock book, recording authentic pedigrees of horses and of cattle, is much to be desired. Some breeders deeming such a publication of great importance, have taken preparatory steps to effect that object—a mass of matter has been col-

* The Jews, the descendants of Abraham, have a synagogue in Cincinnati, and their priests superintend the slaughtering of the bullocks. When the animal is opened the intestines must all be perfect, free from blemish. If any imperfection exists, the butcher is told to kill another, until an unexceptionable one is opened; then the token is put on and the beef sent to market. The butcher that supplies the Jews with beef, informed me that he had to get cattle for the Jews exclusively from Kentucky, on account of their superior state of health over the Ohio fed cattle.

lected, and arranged by the Committee on Cattle for publication. But the inertness or indifference on the part of the breeders of horses, has retarded as yet the publication of this useful book. It is still hoped that their good sense will prompt them to do what is necessary and requisite to publish a complete *Kentucky Stock Book*.

ON FLOWER BEDS.

From the Magazine of Horticulture.

The laying out of a flower knot, or system of beds in a flower garden, is one of the first tests in which the young gardener undertakes to show off his abilities; and being one which affords the most ample scope for the play of fancy is therefore, perhaps, the one in which he is most likely to manifest the display of a bad taste. Even where the design is of the most happy conception, and the plotting beautiful upon paper, the difficulty of defining and preserving accurately the outline of the figure, when practically applied, will often quite destroy the anticipated pleasing effect. Edge-boards of wood, so thin as to be easily bent to the required form, are commonly the first material employed. These are soon warped out of shape, or quickly rot, and impart a deleterious principle to the soil in contact with them; and a very common fault is to have them too wide, so that the plants in the beds suffer from drought, while the paths between them resemble gutters, more than walks for pleasure.

Bricks, or tiles moulded expressly for the purpose, are next resorted to, and if sunk so that the earth in the beds shall not be more than from one to two inches above the level of the paths, they serve pretty well for some time. But so soon as they begin to crumble from the influence of frost, or are covered with green mould or moss, as they soon will be in moist or shady exposures, they become offensive to the eye, though not, like the first, injurious to the soil. A living margin, therefore, becomes the next and last expedient; and indeed it may be regarded as one of the last steps in the march of horticultural refinement. To adapt such a line of vegetation to the size and form of the bed, and make it harmonize in every point of reference with the group of plants within, requires a cultivated delicacy of perception, a sound judgment and an accurate knowledge of all the principles of natural and gardenesque beauty, as well as of the characters of the plants or materials which are necessary, with a due arrangement, to produce it.

It is probably as difficult to fix upon the most suitable plant for the edging of a flower bed, as it is to determine the best shrub for a hedge around fields. For the borders of main avenues, or broad walks in grounds of considerable extent, box, as recommended, Vol. V., p. 350, is undoubtedly the best; but for small parterres, or the flower beds in a front door yard, it seems much less suitable. They can commonly be taken in at one glance of the eye, and notwithstanding all that has been said of the artificial or geometric style, it is the proper one for such places; for symmetry, or a perfect balance of corresponding parts, greatly strengthens the impression of such a scene, taken as a whole, or single mass of objects. The beds, therefore, will not only be small, but when there

is the proper variety in the form of them, some, at least, must have quite acute angles. Box, if thrifty, (and, sickly, it would be an eyesore any where,) soon takes up too much space in breadth; it becomes a harbor for slugs and other noxious vermin; and its numerous, greedy, fibrous roots so exhaust the soil, that no bulbous or other flowering plants, which are the primary objects in such situations, can flourish within a considerable distance. To be kept in the proper dimensions, both as to height and breadth, it requires frequent clipping, and for some time after that operation it presents a raw, stiff and unpleasant aspect; though, to be sure, after the new growth has concealed the cut extremities, it will present a most charming line of verdure. Box is, moreover, apt to be winter killed at the north, and summer killed at the south; and it will also not unfrequently die off in some places without any obvious cause, leaving unsightly gaps, which it is impossible, or requires a long time, perfectly to fill.

Dwarf iris, hyssop, some species of phlox, stone crop, and even a few kinds of grass, are, for a time, exceedingly pretty; but they soon spread too much laterally, while, from pressure or old age, or exhaustion of the soil, they die away in the middle of the line. Certain sorts of bulbous roots such as the crocus, jonquil, and other Narcissi, hyacinths and the like, with their brilliant flowers and lively foliage, leave nothing further to be desired, while they last; which is but for a brief space in the spring, and we can only supply their place by a row of some annual, such as Chinese pinks, sweet alyssum, candytuft, &c., which, in their turn, must give way to China asters. And, upon the whole, perhaps no single plant whatever can fulfil all the requisite conditions, viz., a narrow and low line of perpetual green, diversified with flowers, to delight us with the contrast of their colors or the deliciousness of their perfume. A new charm would be added, if we could procure a successive variety of these; for what is likely to meet the eye several times every day, for months together, will soon lose its effects from monotony. We must, therefore, have recourse to a combination of several kinds, which will vegetate and flower in succession, without interfering with each other, upon the same ground.

A few years ago, I commenced the trial of a plan, which has succeeded so well thus far, that I now recommend it to the attention of others, especially to those of the middle and southern states; while an analogous course with more hardy plants may succeed better at the north, though I think, with the protection of a bed of leaves, the same would withstand the winter in the vicinity of Boston. I planted in the same line, and so close as almost to touch each other, one bulb of each repeatedly, three kinds of Amaryllidaceæ, of nearly the same habit, and which multiply by offsets so fast, that they can be easily obtained in sufficient quantity, viz., *Zephyranthes Atamasco*, *Z. rosea*, and *Sternbergia lutea*. Early the next spring my row of atamasco flowers, of the most brilliant white changing to pink, was the admiration of every passer-by. They continued to push forth for several weeks, and, for a considerable time after, their leaves formed as fine a margin of green as one could wish to see. These leaves had scarcely begun to die away, when the flowers of the rosea began to appear, and kept flowering

nearly all summer. The leaves lasted till late in the fall, when the crocus-like golden flowers of the *Sternbergia* took their place, and had a double cheerful effect from all the adjacent vegetation having fallen into "the sere and yellow leaf." These flowers, it is true, were more transient than the others, continuing perhaps for eight or ten days, but they were immediately followed by their peculiarly rich green leaves, which preserved the border fresh and perfect, till the *atamasco* appeared again. The second year the edging was very much more beautiful, from the flowering bulbs having increased three fold. How long they can be permitted to remain without being dug up and reset, I know not yet, probably from three to five or six years; but if it were required to be done every year, it would be well worth the trouble. At any rate, I know of no better way of obtaining the combined grand desiderata in an edging for flower beds, viz., humble growth, perpetual greenth,* and variety in the color of a succession of flowers. I only regret that I cannot say much about their perfume. M. A. W.

Athens, Ga., Dec. 1839.

SOWING [KENTUCKY] BLUE GRASS.

From the *Agriculturist*.

The time for sowing this excellent grass, is from the first of February to the last of March; though some farmers sow in autumn, but generally it does not do so well as soon in the spring. Almost any soil in Tennessee would produce grass, if well managed but the rich limestone regions are more favorable to its growth. Clover will grow pretty well on clayey and sandy soils, but for blue grass, they should receive several coats of manure first. It is a subject of controversy with farmers, to determine whether it is best to sow on old fields which are free from timber, or in fresh woodland with a moderate degree of shade. In Kentucky, graziers are adopting the plan of sowing on their old fields in preference to woodland, and find that they afford rich pastures, furnish a greater yield of seed, cattle are more fond of the grass, and the butchers pronounce the beef far better than when bullocks are fattened on grass grown in the shade.

So far as we have had the opportunity of gaining information in this state, we are strongly inclined to the belief that most of our old fields, which are not too much exhausted, are better for grass than timber land. Though as most farmers wish to save their timber, they would do well to keep much of their woodland in grass, as it will be tolerably good and not at all deteriorate the soil.

Land before sowing should be freed from leaves and trash, so that the seed may immediately come in contact with the soil, and thereby be sure to vegetate and get strong and deep roots before the heat of summer.

Ploughing is unnecessary and injurious in sowing blue grass, as it renders the ground too loose to insure a stand—a firm and moderately hard surface is to be preferred. One bushel is commonly the quantity of seed allowed to the acre; but some experienced farmers recommended more, others less. To obtain a good set, it is recommended.

* I use this very convenient word on the authority of Horace Walpole's Letters, where it occurs more than once.

ed to turn in all the stock of the farm so soon as the seed is sown, to tramp it well into the earth. To effect this object, it would be well to scatter shell corn over the field that the stock may pass over all the surface to do their work. In England and the eastern states the ground is harrowed and rolled after sowing, which is quite a successful mode. We have no reason to doubt it would answer admirably in this country, and we expect to try it soon.

Blue grass cannot be pastured with safety the first season; or even the second, till it goes to seed, when light stock may go upon it; but care should be taken, that it is not eaten down too close. Close grazing has been the destruction of many an excellent pasture. Some thirty years ago, several gentlemen left the richest portions of Kentucky, because they said "it was not a grazing country; but the secret was, they overstocked their farms, and fed their grass so close that the sun had too great action on the roots, and by that injudicious means destroyed it; as subsequent experience has proved that one of the best grass growing regions of the world. Many have doubted whether or not Tennessee will produce blue grass; but from our own observations on the grass of Kentucky, Ohio, and all the northern states, we unhesitatingly assert that we have seen as luxuriant growths and fine sets of grass in Tennessee as in any part of the United States. True, it has been in small lots and patches; but it shows what can be done by proper management.

In some respects blue grass pastures will be better here than farther north. They can be pastured later in autumn, more in the winter, and earlier in the spring; though not so much in the heat of summer. If farmers would suffer their stock to run on their grass lands but little in the summer, that there might be a rich foliage to protect the roots, it would be decidedly to their advantage. We may be asked by an objector, what is to be done with the cattle in the hot dry season, if they are to be shut out of the blue grass lots? We answer, that during that time, wheat, rye, and oat fields will amply supply the deficiency. All we lack is a little more patience and scientific improvement, to have pastures as rich as could be desired.

From the (London) Library of Useful Knowledge.

A GLOUCESTERSHIRE HILL FARM. COMMUNICATED BY MR. JOHN MORTON, CHESTER-HILL.

Continued from page 132.

Rotation of crops.

The greatest part of the arable land of this farm is cultivated according to the system generally adopted by the best farmers on the range of the Cotswold hills:—The first year, turnips; the second year, barley, or oats, if the land is not so well calculated for barley; the third year, clover, which is mown for hay, and is a mixture of red and white clover, trefoil, and rye-grass; the fourth year clover, pastured with sheep, till July, when it is ploughed for wheat; the fifth year, wheat; the sixth year barley or oats, if the land is better adapted for them; after this last crop, some of the best and cleanest of the land, being sown for winter vetches, is fed off in the spring with sheep, and

then sown for the last of the crop of turnips—all the remainder forming the principal turnip crop; and thus the course begins again.

The last crop of this course, it may be supposed, ought not to have been taken; but having had clover for two successive years before the crop of wheat, the farmer not only thinks himself entitled to a crop of corn after the wheat, but believes he gets better crops by this rotation, upon such poor thin land, than he could get by having the crop of wheat after the first year's clover, or by putting a green crop, of any description, between the wheat and the oats or barley. Sometimes, however, the crop of wheat is taken after one year's clover; and if the land is firm enough for wheat, it succeeds very well; indeed, we have seen it succeed much better than after the second year's clover, upon land given to land-grass.

This plan is not generally adopted in the neighborhood, and when it is adopted, it is on land of better quality than the greater part of the farm of Beverston; but even when wheat is sown after one crop of clover, the farmer never fails to take a crop of barley or oats after the wheat;—a mode which would not be an improvement in a general system.

Some of the poorest land in the farm of Beverston is allowed to lie three years in pasture before it is broken up for wheat. On the forty arable acres of the third and best sort of land in this farm another rotation is adopted:—The first year, wheat; the second, beans; the third, barley; the fourth Swedish turnips; and the fifth, potatoes. The Swedish turnips, of the fourth year, are used the last in the season; and as it frequently happens that the land is too hard and dry to be ploughed up, and reduced in time for barley, potatoes, being an excellent preparation for wheat, have been introduced as the fifth crop in the course.

A seventh part of the arable land of the farm is always in saintfoin, which, when it is worn out, is broken up, and an equal quantity laid down in its stead.

1. *Turnips.*—We will begin with turnips, as being the foundation of all good farming on the Cotswold hills. If we succeed in getting a good crop of them, we may calculate on all the other crops of the course being good also. Nothing puts land in better order than a large crop of turnips; and on this crop depend entirely our prospects of future profit. We are, therefore, very anxious to prepare for this crop, get all the dung for it we can, and spare no expense in cleansing, hoeing, and doing it well.

With this root we can now cultivate with advantage those thin, light dry soils, which, before its introduction, lay in a state of nature. The food which it produces for sheep enables the farmer to keep a much greater number of them; and the additional quantity of manure which is thus produced on a farm, where such an article cannot be purchased, is incalculable. The sheep are now kept on turnips during the winter and spring months, as well as, if not better than they are in the summer; and are fattened through that period of the year in which it used to be difficult to keep them alive.

The additional quantity of stock which the turnip system enables the farmer to keep is great. It is of the greatest value, therefore, in every course of husbandry, producing abundance of food

for beasts, in the course of the production of abundance of food for man; and the soil being turned, by means of it, to the uses for which it is best adapted.

The whole of the arable land on the farm of Beverston is sown to turnips once in the course of rotation; about one-third of the whole crop consists of Swedish turnips, (the best of the land being selected for them,) the remainder of the white Norfolk and the red-tops.

Preparation for turnips.—The land intended for turnips gets the first furrow, as soon as it can be accomplished, after the harvest is over. The first furrow is always ploughed as deep as the plough can go on this sort of land; and, it must be remembered, the soil on this formation is very shallow: for, in very few instances, and these of very limited extent, is it six inches deep, the generality of it being not more than four inches; so that if it can be ploughed four inches, it is thought a good depth. Before the first ploughing is given, all the spots on which there is any land-grass or black couch, are first breast-ploughed. The reason for breast ploughing these is, that the roots of the black couch not going deep into the ground, but spreading over the surface and striking at every joint of the plant, the portion shaved off by the breast-plough containing both root and branch of the weed, is much more easily dragged out after the second ploughing, and shaken out the first fine weather thereafter in spring.

The second ploughing is given to the land intended for turnips as early in the spring as the weather will allow, and across the ridges, as deep as the first. In January or February, it is generally completed; and, as soon as the land is dry enough it is gone over ('twice in a place' where the land is foul) with the drag-harrows, and afterwards with the common harrows, to shake out the black couch, which is raked up and burned. The land is thus made as fine as is necessary for the crop; and all these operations are completed as early in the spring as possible. If the land requires another ploughing before the seed-furrow, no time is to be lost in accomplishing it. It is given for Swedish turnips in April, and in May for the common, that the land may lie some time before it gets the seed-furrow. The greater part of the common, and the whole of the Swedes, are drilled.

The middle of May is the best time for sowing Swedish turnips. In this climate they run to seed if sown sooner; and, if sown later than the end of this month, they do not do so well. The operation is performed in the following manner:—Some of the teams are employed in forming one-hout ridges, others are hauling dung and depositing it in the hollows between these one-bout ridges, at the rate of fifteen cart-loads per acre. The greatest care is taken to spread the dung regularly over all the hollows between the ridges, so that there may be a continued line of it from one end of the ridge to the other. When this is accomplished, some of the other teams follow, split the ridges with a double-mould-board plough, and cover the dung by turning them over. Then follows the drilling in of the seed, which is performed thus:—A light roller, which is made to roll two of these ridges at once, the first time it goes along the field, takes but one ridge with one of its ends; and, in returning, while it rolls this a second

time with the same end, rolls a second ridge the first time with the other; which, again, in returning, it rolls a second time, along with a third ridge the first time. In this manner it goes over all the ground twice, the sowing-machine, between the first and second rollings, depositing the seed in the middle of the ridges, in a continued line, directly above the line of dung, and at the rate of three-quarters of a pound of seed per acre. This machine is guided by a man, and being attached to the roller, the same horse draws both; the machine is of Mr. Hayward's construction.

The time of sowing the common turnips is in June, and a great part of these is also drilled: but what is sown broad-cast is dunged before it gets the last ploughing, care being taken to have it spread equally over all the ground. The seed is sown with a machine, which a man wheels before him, and which sows at the rate of one pound and a half per acre and seven or eight acres a-day.

Hoeing.—The hoeing begins as soon as the rough leaf makes its appearance, on those that are sown broad-cast; but those that are drilled sometimes get the first hoeing before this period, particularly if the land is subject to annual weeds. Twenty men and boys are generally employed in this work. The turnips always get two hoeings, which cost fourteen shillings per acre, besides two quarts of beer per acre, for each hoeing. This work requires to be well performed, as on it depend in a great measure the bulk and value of the crop. The loosening of the soil about the roots of the plants with the hoe tends much to their growth.

Many farmers in this district put their lambs amongst the turnips in August and September, to keep down the weeds that spring up amongst them, particularly the charlock. This does no good; and the presence of weeds is an evidence of the slovenly way in which the land has been prepared for the turnips, and of the imperfect manner in which the hoeing operation has been performed. This mode of weeding turnips by lambs is never resorted to upon this farm. The hoeing, as it is here performed, answers the purposes of thinning the turnips to the proper distances, of cutting up *all* the weeds, and of loosening the soil around the roots of the young plants, which both hastens and enlarges their growth.

The turnips, in general, are much larger, and the weight per acre much greater, when they are drilled, than when they are sown broad-cast; and the chief reason seems to be, that, when they are drilled, the seed being deposited directly above the dung, the roots of the plants get in contact with the whole of it; whereas, it is merely by chance if the seed is deposited upon it, when sown broad-cast.

The Swedish turnips require a better soil than the common; but the advantages of them are very great. Neither cattle nor sheep require so much hay by one-half, when feeding on them, as they require when feeding on the common turnips. And, besides this, they keep much better in the spring, which is of immense consequence,—the common turnips not keeping longer than March. In consuming the common turnips with sheep, one ton of hay per acre is generally given: only half this quantity is required by the sheep, when they have Swedish. The value of these, therefore, over other turnips, of the same weight of crop, is at least equal to half a ton of hay per acre. But the sheep

also thrive much better upon them; and this is an additional value that cannot be estimated.

All the turnip crop is fed off on the ground; and, in folding, the plan adopted on this farm is to have three or four lots of sheep in the same field at once, but so as to allow each lot to run over the ground which it has cleared. It is found that, when sheep have a good quantity of ground to run back upon, they thrive better than when they are cooped up on a small space. By this plan, also, the dung may be distributed over those parts of the field in which it is most wanted, by putting each of the lots of sheep on the poorest part of the field first, and making them eat the turnips on the richest part last. The labor of a team that is required in cultivating this crop, may be stated equal to six and a half days, per acre, on what is sown broad-cast, and seven and three-quarters per acre on what is drilled.

A portion of the Swedish turnips is left for the sheep, till late in the spring. The land upon which they grow is much impoverished by the fresh growth of the plants in the spring. A peculiar course of cropping is, as we have already mentioned, adopted on this land, which is a portion of the best of the farm,—it is planted with potatoes instead of barley.

II. Barley.—In preparing the land for the barley that is sown after turnips, it is either ploughed, or sometimes only half-ploughed, (*raftered*, as it is called here,) as fast as the ground is cleared, and, generally, across the field: the harrows are drawn over it, if it has been *raftered* or half-ploughed, to level the land a little, before it receives the seed-furrow. The first furrow is as shallow as it can be ploughed—just deep enough to cover the manure that has been dropped by the sheep; the second furrow is a little deeper. The land having been previously cleaned and well pulverized for the turnip crop, nothing more is wanted now than to get a good seed-bed for the barley and the seeds that are to be sown with it.

The labor that is required to prepare the land for this crop depends upon the state of the weather during the time the sheep were consuming the previous crop. If the weather was dry, the land will be left in a most excellent, friable state; and with one ploughing, it will, perhaps, be in a better condition for receiving the seed, than with three ploughings, if the crop was eaten off by sheep in wet weather; for, by their trampling in wet weather, the surface of the land is left like clay well tempered for making bricks; and, unless the land, in this state gets frost after the first ploughing, it will, in the second ploughing, be turned up in hard lumps, which cannot be reduced but with considerable labor. A heavy roller is used for this purpose; but no labor can reduce land, in this state, so well as a good, hard frost would in one night. The earlier that land, which has been trampled by sheep in wet weather, is ploughed, the greater is the chance of getting frost to assist in reducing it to a proper state of pulverization, a greater degree of which is required for the seed-bed of barley than for that of any other grain that the farmer cultivates.

The quantity of seed sown is four bushels and a half per acre; it is always sown broad-cast, and is never drilled on this farm, nor in the district.

Amongst the barley the grass seeds are sown with a machine, which a man wheels before him;

and the plan adopted on this farm, and which is thought to succeed the best, is as follows:—The rye-grass, the trefoil and the white clover seeds are, with the barley, dragged in with the drag-harrows, with four horses, which go over about seven acres a day. After this the land is harrowed across with three horses at the rate of about ten acres a day. The red clover is sown with the machine, just when the harrow comes above the ground, and is rolled in with a roller, ten feet long drawn by two or three horses, which do about twelve acres a day. The reason for this part of the plan is, that the red clover frequently grows so fast, as to overtop the barley altogether. By this plan the barley gets the start of the clover, which is thereby kept in its proper place.

The quantity of grass-seeds required varies, according to the quality of the soil; but the average on this farm is—two bushels of rye grass; six pounds of trefoil; four pounds of white, and eight pounds of red clover; the proportions varying according to circumstances.

The produce is about three-quarters and a half of barley per acre. The expense of mowing is eighteen pence per acre, and one gallon of beer; the expense of thrashing, which is done with the flail, is two shillings per quarter, including the winnowing. About half of the straw is eaten by cows and oxen; the other half is trampled into manure.

III. *Clover after barley.*—The grass seed sown amongst the barley consists of rye-grass, trefoil, and white and red clover seeds. The soil of this farm is not well adapted to red clover, which often fails; and, although upon some of the land the plants come up and seem to thrive, yet the crop is always very light, the rye-grass forming the principal part, if not nearly the whole of it.

The whole of this crop is mown and made into hay. The mowing commences as soon as the sainfoin hay is cut down, and just when the blossoms of the rye-grass and red clover appear. This is about the first or second week of June—never later.

Hay of the above composition of grasses Mr. Hayward thinks the best of all hay, if it is cut early, when the natural sap is flowing; for a process of deterioration commences and goes on from the time the rye-grass begins to come into blossom till the seed is perfected, the plants becoming hard and the natural sap being dried up, in which state it is of little or no value as hay, and little better than wheat straw. When rye-grass and clover are allowed to perfect their seed, they are thrown into the cribs of the store-stock, or cut up with other hay as chaff for the working cattle.

The whole of the clover and rye-grass on this farm is cut down, whatever is the state of the weather, as soon as it is ready; for it takes more injury by standing than by being cut down in a wet state. A man generally mows an acre and a half a day. There are generally twenty mowers employed upon this farm; and from thirty to forty haymakers, the latter consisting of men, women, and stout boys. The mowing costs sixteen pence an acre, and a gallon of beer a day to the mower.

After the grass has been cut down about two days in drying weather, and has become withered or dried on the top of the swath, it is turned over with a rake, in doing which care is taken to keep

it together as much as possible. It sometimes requires to be turned a second time; but only when the weather is unfavorable. As soon as it is dry enough, it is put into cocks with the barley or three-pronged forks, and raked between the cocks with the long or ell-rakes. These rakes, which are more than double the length of the common rakes, are used in preference to the latter, because more work can be done with them. The wagons, following after those that are cocking, clear the field as they proceed. The strength of team that can be brought to bear upon a single field soon carries the whole of the hay to the rick. The ricks are built on or near the place where the hay is intended to be consumed; and in the field sown to turnips, a rick, equal to a ton per acre, is generally placed.

The whole of this crop is consumed by sheep and horses. Great crops of clover and rye-grass hay are not to be expected upon land of the quality of this farm. A ton per acre is reckoned a great crop.

The second year's crop of clover and rye-grass is fed off with sheep. Every means is used to prevent the rye-grass from coming to seed; for if seed is produced, it will grow amongst the wheat, the following year, injure it very much, and shorten the crop. The couples (a ewe and lamb) are put upon this crop in the first instance; and after the lambs are weaned, the whole of the ewes. They are kept so very thick upon it as to crop it to the very ground; for the harder the ewes are kept when their lambs have been newly taken from them, the sooner the milk goes from them. This crop keeps two couples per acre for about six weeks; and four ewes, after this, till it is ploughed up for wheat.

IV. *Wheat.*—The wheat crop, as we have already observed, is generally taken after the second year's crop of grass, which has been pastured by sheep, and eaten by them so close to the ground, that none of the rye-grass may come to seed. The preparation of the land for wheat begins immediately after the turnips are sown. This is about the first of July. The land which requires it, is first raftered or half-ploughed, that it may lie in this state for some time to let the turf rot. It is then harrowed and gets the seed-furrow in August. But all the land, that requires only one ploughing, receives the seed-furrow before that which has been raftered; for when it gets only one furrow, it requires to lie longer before it is sown.

The sowing begins, without any other preparation, as early in September as the season will allow, that is to say, as soon as the land is wet enough for it. The heavy drags, with six oxen or four horses, go over the land "twice in a place," in the same directions in which it was ploughed, taking care that the crowns of the ridges and the furrows get a full share of this operation: indeed, three times of the heavy drags is generally given them to break the staple of these parts of the ridge. The drag-harrows follow after the heavy drags, and go over the land obliquely "twice in a place" also. The last part of the process is performed with the common harrow, at right angles to the way in which the land was ploughed. The reason for altering the direction in these several operations, is, that the upper part of the furrow-slice may be well broken without turning it over; and

because the tines of the drags and harrows get deeper into the ground in this way, and are much more efficacious than if the whole of these operations were performed in one or two directions. The rougher the surface is left after this the better if the clods are not too large. Women are now employed to go over the whole of the land that is sown, to break all the large clods and to turn all those that have any grass on them with the grassy soil undermost. Whatever part of the wheat requires it is hoed, as early in the spring as possible, by men with narrow hoes, at from three and sixpence to five shillings per acre.

The seed is selected of the best quality, of the *previous year's growth*, and perfectly clean and free from all seeds. The red-straw-lammas is the kind that is always sown upon this farm. No such thing as smut is ever known upon this farm, which is prevented, we believe, by the invariable use of old wheat for seed. When wheat that has been harvested in August is sown again on the first of September, it has not had time to be so well hardened and so perfectly prepared for vegetation as it ought to be; and, therefore, does not produce a crop so perfect, in every respect, as old seed: and hence the smut. Nor is there often either rust or blight on the wheat produced on this farm, which is probably owing to its being much exposed.

The wheat harvest, in the Cotswold hills, begins generally in July; and Mr. Hayward is fully persuaded of the propriety of harvesting this crop, before it is fully ripe, the quality of the grain falling off very much, when it is allowed to stand till that time. The proper time for cutting it is, he thinks, when the roots cease to convey nourishment to the plants. The expense of reaping is six shillings and ten quarts of beer per acre.

The whole crop is carried, as soon as it is ready, and stacked in the barn-yard adjoining the farmhouse. When this operation begins, the whole strength is brought to bear upon one point. We have seen a large field, at the distance of a mile and a half from the barn-yard, cleared in a day by seven teams and eight wagons, conveying from the field to the ricks forty-two wagon loads of about thirty bushels each. This was six journeys of three miles to each of the teams, besides the distance gone over in the field in loading the wagons, which would make the whole journey for each team at least twenty miles. The ricks are made very large; consequently a great many hands are employed. Two ricks are building at the same time, and one of them is always nearer finished than the other. While the rick is level with, or lower than the wagon, only one man is employed in unloading; but when the rick is higher than the wagon, there are two employed till the rick gets very high, when one man unloads, the work being then necessarily carried on more slowly. When there are two men unloading the wagon, there are generally three building around upon the rick, attended by three boys or girls to lay the sheaves to them, and other two to throw the sheaves to the former from the pitchers. On the other rick there are one or two builders, with a sufficiency of tenders to carry on the work with expedition and efficiency. In the field there are two men pitching to each wagon, two building the wagon, and a boy driving the team. There are always two wagons by the rick unloading;

two in the field, loading; two on the road, with loads from the field to the rick-yard; and two empty ones going from the rick-yard to the field. After the wheat is carried, the stubble is mowed and carried to the yard, stacked and used as litter for the beasts in the courts.

The expense of preparing the land for a crop of wheat may be estimated at two and a quarter days' work of a team per acre; but it is impossible to make an *exact* estimate of the labor required for this or any other crop, the labor itself varying with circumstances. The state of the weather alters the state of the land. If the weather is adverse, the labor is increased; if favorable, it is diminished.

When, as is sometimes the case, a portion of the poorest of the land is allowed to remain three years in grass, an equivalent portion of what has been but one year in this crop is prepared and sown with wheat; in order to preserve, as nearly as possible, the regular quantity of wheat and of clover for the food of the sheep, which is about one-seventh of all the arable land.

The thrashing of the wheat is performed with a machine and four horses, by four men, three women, and a boy, thrashing from ten to twelve quarters per day, and costs about a shilling a quarter for manual labor, making, if we take into account the value of the horses' labor, the expense of this operation with the machine, at least, equal to what it would be if the work were done with the flail. The advantage of the machine is, that you get the work done at once, whenever you wish it, and without the loss of corn attending the use of the flail, which is, at least, equal to the value of the horses' labor in the season of the year when wheat is generally thrashed out.

That part of the wheat stubble which is foulest is breast-ploughed and burned in the spring and sown with turnips. It afterwards takes its course in the general system.

V. Oats and barley after wheat.—The land generally gets two, sometimes three ploughings,—the first as early as possible, the second early in March. When the land is clean, it is rastered or half-ploughed only the first time. The oats are sown, about the end of March, upon the coarsest or roughest of the land. The seed, of which six bushels are sown to an acre, is dragged in with the drag-harrows, and is afterwards harrowed sufficiently with the common harrows to cover it. The sowing of barley should begin and end in April. In preparing the land for this crop, it requires from three to four days' work of a team per acre;—the oats requiring more than the barley, because they are sown upon the roughest part of the land.—The oats and barley are stacked in one of the rick-yards nearest the field, and are built into square ricks; but all the barns are first filled with barley. They are thrashed with the flail, at two shillings per quarter.

Beans.—A very limited quantity of beans are sown, and these after the wheat-crop, upon that portion of the forty arable acres of the third or best kind of land, on which a peculiar rotation is adopted. The land receives only one ploughing. It is ploughed before Christmas, and the planting is begun as early in the spring as the weather will allow. The mode adopted in this neighborhood is, to plant the beans in rows about fifteen inches apart, and about eight inches from hole to hole in the row, dropping three or four beans into each

hole. They are planted at this distance in the rows, that there may be room for the hoe to get in between them, when they are hoed. The Berkshire bean (as it is called here) is used for seed; and about three bushels are required to plant an acre. The planting, which costs about five shillings per acre, is performed by men and women; and the ground planted is run over each day with the harrow, to fill up the holes and cover the beans. The hoeing (two hoeings being given, if required) begins as soon as the beans are above the ground. It requires to be done as deep as to reach the roots of all the weeds; and costs from six to eight shillings an acre.

Instead of being ploughed, the land is sometimes dug with the spade, which can be done when it is too wet to admit of being ploughed. The expense of digging is from twopence to twopence-halfpenny per perch, or from twenty-six shillings and eightpence to thirty-three shillings and fourpence per acre.

The reaping of this crop is never done till all the leaves drop off, and the stalks begin to get black. It is reaped, tied into sheaves, and set up into shocks for eight shillings an acre. It is soon ready to be carried after it is cut, and it is stacked in the rick-yard. It is always thrashed out with the flail, and at the rate of twenty pence per quarter. The produce is about twenty-four bushels per acre. The straw is kept to put under the ricks, and is afterwards made into dung. After the crop is carried, the land is dragged first one way and then across, to loosen the roots. These form a good store of winter fuel for the poor, who are allowed to pick them up, and for whom Mr. Hayward carts them home.

Potatoes.—Upon the forty arable acres of the best sort of land, potatoes are introduced in the rotation after Swedish turnips, which are fed off so late in the spring, that it would be difficult to get the land prepared for barley or oats. The only thing peculiar in Mr. Hayward's mode of cultivating this crop is, that he generally plants them after the breast-plough instead of the common plough; and as it is intended to describe the mode of cultivating this most valuable root, practised on the farm of Stancombe, in the lower part of this county, where the cultivation of it is the principal object of the farmer's attention, we shall abstain from any details here.

Vetches.—A crop of winter vetches is taken upon a portion of about thirty acres of the best and cleanest of the land, destined, in the course, for turnips. The land is ploughed once, as early as possible after the crop of oats or barley is cleared. The vetches are sown broad-cast, and dragged and harrowed well, to get all the seed covered, two bushels and a half of which are required per acre. A few acres of them are generally kept to supply seed for the crop of the following year; and a small quantity sometimes cut and given as green food to the horses in the early part of the spring. All the rest is consumed with sheep on the ground,—the sheep being folded on them as on turnips. As the vetches are fed off with the sheep in May and June, the land is prepared for turnips; and the cultivation necessary for these after vetches is the same as that which has already been described.

Vetches, like every other crop, thrive best upon the freshest land, that is, upon the land which has

not grown a crop of the same kind for the greatest number of years.

Saintfoin.—This plant will not grow upon the thin clay, nor upon the dead or 'fainty' sand; but upon all the stone-brash soil, it is the most valuable plant that ever was introduced into this district; for with it the farmer is able to get one ton and a half of the most excellent hay, where he could not get one-fourth of that quantity before. The driest season seems not to injure it, nor does a wet season retard its growth. It makes the best food for sheep and horses; and the hay made from it will keep three or four years without sustaining the least injury.

The saintfoin crop is taken, on this farm, after the barley, which follows the turnip crop in the general course. But as the sheep, which consume the turnips on the ground, consume also upon it one ton of hay per acre, the seeds which drop from the hay would grow up amongst the saintfoin, were it sown amongst the barley. Mr. Hayward, therefore, prefers taking a crop of oats after the barley, that all the seeds of grass, top-grass, and other seeds, which come up amongst the barley, may be destroyed by the two ploughings that are necessary in preparing for the crop of oats. The saintfoin is sown amongst the oats, at the rate of four bushels per acre, without the mixture of any other seed whatever, the saintfoin being thus left in full possession of the ground. The first year's crop of saintfoin, which is had by thus sowing it unmixed with trefoil and other seeds, contrary to the practice of some farmers, is light; but the plants are much stronger the second year, and it then comes to a full crop. Some farmers sow only from two and a half to three bushels of seed per acre; and although, when sown so thin, the plants may last longer, yet their stalks are much larger and more woody, and make strong, coarse hay: whereas, when the land is sown thick, the stalks being much closer together, are much finer, and the hay is of a very superior quality. In the latter case also, the sheep eat the saintfoin much better, when they are put to pasture it, after the crop of hay is made.

When the saintfoin plants begin to fail, which is about the sixth year, the land is pared and burned, and sown to turnips, being first properly prepared, and then enters into the general system. But it is never broken up till another portion of land has been laid down to fill its place, one-seventh part of all the arable land being always in saintfoin.

The saintfoin is earlier ready for the scythe than the clover; and as soon as the blossoms appear, it is cut down. The sooner it is cut, after their appearance, the better is the quality of the hay, though the quantity may not be so great. If it is allowed to stand till all the blossoms come out, the stems get very woody and hard, and it loses great part of its excellent qualities as hay. This plant, like clover, must not be shaken about much in making it into hay, as the leaves easily part from the stalks. It is on this account turned over only once; and if the weather is at all favorable, as it lies very loose and open, it will be ready to carry in four or five days, with one turning.

The time of mowing the saintfoin crop is about the first of June. The expense of mowing is generally two shillings per acre, and a gallon of beer to each man, per day. It is a good day's

work to mow one acre and a quarter of this crop, which produces one ton and a half per acre of hay, of the most excellent description for fodder for sheep and horses.

The latter grass is fed off with lambs in August and September, and generally keeps three lambs for two months. The crop of the sixth or last year is always pastured with sheep, being very seldom worth mowing.

When part of this crop is allowed to stand, to afford the seed required in the following spring, it is always carried and stacked, either early in the morning, before breakfast, or late in the evening, the seed being easily shed, if it is turned or mowed, when the sun is strong upon it. Twenty bushels an acre is reckoned a good crop.

English, or meadow hay.—The meadow or natural grass is the last that is mown; and the hay-making machine is put to work in the field to ted or shake out every day's work, the day after it is cut down. This it does in the most perfect manner, and the whole of the tedding is done with it till the grass begins to get dry, when, as from the violence of its operation it would shake out the seed, its assistance is dispensed with. In wet weather it is very useful in shaking out the hay that has got stained or has clung together from the rain.

When the hay-making machine has done its work, the hay is hatched or rolled up, as it is called; that is, two people with rakes, and working in contrary directions, rake up the hay into continued rows from one end of the field to another. When the field is all hatched or rolled, people with forks make up the hatches into cocks of such a size as the dryness of the hay will admit of. This is done the last thing in the evening; and next morning these cocks are again shaken out, (three or four of the rows of cocks together,) but much thicker than before, and turned over two or three times during the day with picks or prongs. In the evening the hay is rolled together, and then put into larger cocks; after which, if the weather is fine, it will be ready to carry. It is carried in wagons to the rick-yard, and built into square ricks.

It is a great advantage to hay to get a little head in the rick. If in making it all the natural sap is dried out of it, it is neither of so good quality as that which has been heated by part of the natural sap being permitted to remain, nor does it get so close together, and keep so well.

The natural heat, being a slight fermentation, improves the flavor of the hay, and producing, probably, a portion of saccharine matter, thereby adds very much to its value. Much heat, however, injures the hay, and sometimes sets it on fire. The whole of the meadow hay on this farm is consumed by the dairy cows. Salt has never been tried amongst hay on this farm.

Stock sheep.—A flock of about four hundred and forty breeding ewes is kept upon this farm. They are of the mixed Cotswold and Leicester breed. The ewes will feed to about twenty-four pounds per quarter; but none of the sheep are fattened on the farm. About four hundred are sold yearly. About two hundred of the oldest and worst of the ewes, and a like quantity of wethers; and they are sold in autumn—in September or October, according to the state of the market. The loss from death is about five per cent., or one

in a score, in the whole flock. In the year 1825, the loss in lambs was only six in four hundred and forty-eight, including all the casualties of the year. This was the best year for sheep on this farm ever known. But in 1828 the loss was very great, amounting to eighty-two lambs in four hundred and forty-two, besides old ewes, &c. This was the worst year for sheep ever known on this farm. They were carried off by what is here called the white scour, which began with a stoppage and ended in excessive laxativeness.

The sheep not being disposed of till autumn, upwards of eight hundred are shorn every year. The fleeces may average about five pounds and a half each. The wool is long and fit for combing.

The folding of sheep is generally adopted on the whole of the Cotswold hills. The greater the number of sheep kept on the arable land the greater is the produce in corn. Upon the best cultivated farms in this district about one sheep is kept to an acre of land. Upon this farm there are upwards of twelve hundred kept upon about one thousand acres.

The shepherd's house on this farm is placed between the arable and pasture lands; and the garden attached to it, which is large, is enclosed with high stone walls. This garden is converted into a lambing-fold in the spring. It is made to consist of four general divisions, two of which, occupying the space where the walls are highest and most sheltered, are for the ewes lambing in. The young ewes are placed in the one, and the older ones in the other. In these two compartments of the fold and along the walls, pens are formed of hurdles, of the length and breadth of one or of two hurdles, as circumstances require. These pens are intended for the reception of the ewes that have newly lambed, with their lambs.

In the formation of these pens, the economy which distinguishes the whole management of this farm displays itself. As a great number of stakes are required, to which to tie up the hurdles, not only in this fold, but also where the turnips are fed off, in building the walls of the garden temporarily employed as a fold, recesses, about six inches deep, of the height of a hurdle, and at the distance of the length of one from each other, have been formed in them. The ends of the hurdles being inserted into these recesses are fixed at the ends next the wall, without the aid of stakes. At the opposite ends, they are made fast to stakes in the usual way; and thus pens are formed around the wall.

Into these pens, as has been intimated, the ewes that have newly lambed are put with their lambs, a separate pen being allotted for each ewe and lamb. They remain in the pens till they are able to go in one of the outer and general divisions of the lambing-fold, which are for the admission of ewes and lambs, when the lambs are strong enough to take care of themselves. From these folds they are at liberty to go, in the day-time, into a pasture or fallow-field, and from the pasture or fallow-field into a Swedish turnip-field.

The lambing begins in the beginning of March, and is nearly over by the end of that month. When all are able to leave the lambing-fold, they are divided into three lots;—the oldest, being the six-teeth and full-mouthed ewes, with their lambs, into one lot; the two-shear, or four-teeth ewes with their lambs, into another lot; and the young

or two-teeth ewes, with their lambs, into a third lot. These lots are kept apart, each having a separate division of the pasture or fallow-ground to run in, and of the Swedish turnips to feed.

The ewes do not get any turnips till they drop their lambs. This is only because the quantity of turnips on this farm does not afford a supply for them; and although giving them as many as they could eat would prove injurious to them, yet about one fourth of that quantity would do them a great deal of good. The sheep that are fed upon hay without turnips are allowed an unlimited supply of water; and they drink a great quantity in dry weather.

In October, the lambs, in three or four lots, are folded on the turnips, and have about one ton of clover hay to an acre of turnips. As it is not desirable that the lambs should clear up all the turnips, the shepherd puts them up in the most convenient part of the field, for about two hours every day; and, during this time, the young or two-teeth ewes that are fed on hay, in the adjoining field, are admitted into the fold to clear up "the hulls" or those bits of the turnips which have been left by the lambs. This does the sheep a great deal of good; for, although the quantity left for them is very small, yet being moist food, it makes them eat their hay with a much better relish. They are frequently put to run in a fallow-field, if there is not a pasture or clover-field adjoining the turnip-field, on which the lambs are folded.

When the lambs are weaned, they are turned into the clover latter-math; and the ewes into the grass-field that is intended for wheat, where they are kept very hard.

The food, for the flock of sheep in the winter and the early part of the spring, is turnips, clover and sainfoin-hay; in the latter part of the spring and in summer, the second year's clover, vetches and some of the dry pasture-field, the latter math of clover, and of sainfoin, the stubbles, the young clover, till October, and the last year's or worn out sainfoin.

It is reckoned that a hundred lambs will consume one acre of turnips, of twenty tons, and a ton of hay in fourteen days; and that a hundred sheep, having a large field to run in, and plenty of water, will consume one ton of hay in seven days.

Cattle.—Upon this farm there is a dairy of forty cows, of a mixed breed, between the Wiltshire long-horns, which are famous for giving a great quantity of milk, and the Gloucester breed, which are good feeders as well as good milkers.

The cows are pastured upon the old grass-land, and from them are bred yearly twenty heifer-calves; and six ox-calves of the Hereford breed are bought in every year. The remainder of the calves are sold as soon after they are calved as a purchaser can be found for them. The six Hereford ox-calves that are bought are reared for the purpose of keeping up the number of working oxen, of which there are always eighteen upon this farm. The stock for working oxen is thirty-six, in all—six calves, six year-olds, six two-year-olds, six three-year-olds, six four-year-olds, and six five-year-olds; so that there are six oxen, coming six years old, for sale every year; and six young oxen, coming three years old, ready to take their place. The twenty heifer-calves are

bred to keep up the stock of dairy-cows. This exceeds the number generally bred by the dairy-farmers; but it is required by the quantity, upon this farm, of poor, thin, wet pasture-land, unsound for sheep, which must be fed off with young beasts. The healthiness, too, of the stock, upon this farm even upon the poor, thin clay land, unsound for sheep, is a great inducement to keep a large breeding stock. The cattle are never affected by the husk, the quarter-evil, or the red-water.

The stock for dairy-cows is, in all, a hundred, and consists of twenty calves, twenty year-olds twenty two-year-olds, and forty cows of all ages. In the autumn, ten of the oldest or worst of the cows are sold, and their place is filled up by ten of the best of the two-year-old heifers, which calve in April or May, when they are three years old. The other ten of the two-year-old heifers are sold sometimes in autumn; but they are generally kept till May, when they calve, as more money can be got for them then, there being in that month a great demand from the dairy farmers for milk heifers.

By the above plan a gradual improvement of the dairy-cows is going on, and the greatest care is taken in the selection of bulls; for on them, in a great measure, depends the improvement of the stock.

With such an extent of poor pasture land, and such a stock of straw upon this farm, it is not found advisable to fatten any of the stock for the butcher. Accordingly, the whole of the cows, oxen, and sheep for sale, are sold to the graziers, generally in the autumn, when they are in excellent store-condition.

The calves are foddered during the winter in the pasture-ground, where there is most shelter, and where there is a little pasture. They are foddered with hay in the field from about the middle of November, till they are turned out to the pasture in May. The year-olds are kept in the field all winter, in the same way as the calves, but get straw instead of hay, till near Christmas. They, of course, require more hay than the calves; but much hay is saved by their eating up the rough grass, left by the cows that pastured the ground in the summer, the calves and the year-olds being kept, during winter, in the old pasture-lands, never upon the poor, wet, thin clay. In no instance are more than ten allowed to run together in one field; and they are sorted according to their strength, so that the master bullocks are prevented from running down the weak ones, and the best of the hay can be given to weak ones and to the calves. Mr. Hayward has found, by long experience, that young stock thrive much better, when, in winter, they run out in the field, than when they are kept in a house, or shed, or the straw-yard.

The two-year-old beasts are put up, in winter, by themselves, in a court at one of the remote barns, where they are at liberty, in the day-time, to run out in the field adjoining the court. They are assorted in the same way as the other young beasts, the number put into one court seldom exceeding ten. They are foddered with good straw till Christmas, after which they get hay. It being absolutely necessary that all beasts should have plenty of water, the several lots are at liberty to go to the pond whenever they are inclined.

The two-year-olds must be kept much better than the other young beasts in the latter part of the winter and in the spring; as their productive or their useful season is then drawing near,—the heifers calving in April or May, and the young steers coming into full work at the plough in the spring. All the spring, therefore, a good quantity of hay is served out to them.

The cows are fed, during nearly the first half of the winter, upon straw; and during the other half, upon meadow-hay. When the cows drop their calves in the spring, they are tied up for about two hours, morning and evening, for the convenience of milking. At these times hay is served out to them in the stalls, that the weak ones may feed undisturbed by the stronger ones; and, when they are turned out into the yard, although they have left hay in their stalls, they instantly go to the cribs in the yard, and eat the hay that is there with as good an appetite, as if they had received nothing during the two hours they were tied up. All the hay left by them in the stalls is taken out, and put into the cribs in the yard, where they eat it with avidity, although they loathed it in their stalls. This is thought by Mr. Hayward to be an evidence that beasts cannot do so well when tied up, as when they are allowed to run loose.

The cows are put out to pasture in May upon the best of the old pasture land, about seventy acres of which are required for them, till they can be put upon the after-math of the meadow-land that is mown. All the young stock depasture on the poor, thin land.

The working oxen get straw, and generally a few turnips, in the yard, during the first part of the winter, when they are not much worked; but when at work in the spring, they get hay. Good rye-grass and clover-hay is best for them, as it remains much longer with them than the meadow-hay, which runs through them too fast, when in hard work. When the supply of hay is short, straw and hay are cut into chaff for them. In summer they depasture on the unsound grass land. No corn is ever allowed them.

The quantity of hay consumed by the beasts during the year may be reckoned at about twenty-four tons for every ten of the cows and the working oxen; twenty tons for every ten of the two-year-olds; ten tons for every ten of the year-olds; and eight tons for every ten of the calves.

Horses.—The horses are fed, in winter, upon straw and a little hay, and about half a bushel of oats each per week; but in spring, when they are in full work, they get hay and a bushel of oats each, per week, besides the chaff that has been collected from the winnowing of the wheat, barley, and oats, and kept for them, and which, if heated from a great quantity of it being kept together and pressed down, is the better for it.

When light corn or "tailing" is given to the horses, an additional quantity is allowed them to make up for its lightness; besides what compensation may chance to be made to them by the workmen, who are not very scrupulous about taking corn for their horses, as opportunity offers,—a species of dishonesty not to be too severely reprehended.

The horses get saintfoin-hay, and always some of it along with the chaff from the winnowing of the corn, which is unsound for horses when given

them alone. Chaff, half composed of wheat-straw and half of saintfoin-hay, is cut for them, and given them for about six weeks in the winter, the chaff from the winnowing of wheat, barley, and oats during this time, being stored up for their use in the spring. While they are on this cut chaff, a few turnips are sometimes given them, which are of use in keeping their bowels open, when they are fed upon dry food.

In summer the horses depasture upon the unsound pasture-ground.

Upon this farm there are generally kept ten horses and two brood-mares; two working colts, two year-old colts, and two sucking colts, besides one riding-horse. Two colts are generally bred from the mares to keep up the stock of working-horses.

The quantity of water required by stock, in summer, is very great. No less than a thousand gallons a day were consumed by the stock on this farm,—eight hundred by the eight hundred sheep, and two hundred by the other stock;—the computation having been made by means of a pond, the dimensions and contents of which were known.

Establishment.—On this farm, although large, no bailiff is kept. Mr. Hayward attends to every thing himself, directing every operation, and seeing that it is properly performed. Thus employed, he has not time, nor, finding it incompatible with his interests, has he any inclination to go a-hunting three or four days a week, as some farmers in this district still continue to do. He, therefore, saves the expense of a bailiff, as well as that of a groom and hunter, which this amusement would render necessary to him. The present distressed state of agriculturists will not admit of such expenses. Care must be taken to save at all hands, and to make the most of every thing; and where, as on this farm, a great number of workmen are constantly employed, more is gained by economy in their time and labor than most people are aware of.

Upon this farm there are constantly employed, twenty-five men, seven boys, and three women, viz.,—four men as carters, one of whom being headsman has the charge of the rest, and sees that the horses are attended to; four stout young lads as plough-boys; three ox-men to work the oxen, with three boys to drive, one of these men also being a headsman, in whom a greater degree of trust is confided, and who has the superintending charge of the oxen; three cow-men, to attend to the dairy-cows, one of them having the principal charge of the cows; one shepherd; eight men who, in winter and spring, thrash the corn, in summer and autumn mow the grass for hay, hoe the turnips, reap the wheat and beans, and mow the oats and barley,—and who are paid for their work *by the great*, or by piece-work, seldom or never by the day, receiving so much a quarter for thrashing, and so much per acre for mowing grass and corn, and reaping wheat and beans; six men and boys, paid also by the piece, seldom or never by the day, and employed in paring and burning in the spring, in mowing grass for hay in summer, in turnip hoeing in the season, in mowing and reaping in the harvest, in mowing and raking stubble, and in breast-ploughing stubble in the end of harvest and winter; lastly, a house-keeper and three women employed in the dairy.

Besides the above number of hands, in constant

employment throughout the year, there are employed, in winter, a man to assist the shepherd, and two boys to dock up turnips for the sheep; and in the months of March, April and May, not less than fifteen men, women, and boys, to rake what has been pared for burning and to burn it, to hoe beans and wheat, weed corn, clear up the grass-land, pick up stones, &c.—An additional number of hands is always put on when required. During the hoeing of turnips this year in July, the whole number employed on this farm was sixty-seven. In harvest, such an addition is made to the hands as is sufficient to execute the work in proper time; and in reaping wheat, we have seen a hundred employed, besides those occupied in mowing oats and barley, and in the other operations of the field.

Most of these laborers receiving beer, a considerable quantity is consumed; but to reduce it, a good deal of piece-work is bargained for, without beer. But although this plan is adopted as much as possible, yet we find that, on the average of several years, a sum equal to 58*l.* 9*s.* 10*d.* a year has been paid for malt and hops, for beer for the laborers on this farm. The greatest sum for this purpose (92*l.* 8*s.* 6*d.*) was expended in the year 1826, when malt was 9*s.* 6*d.* per bushel.

Implements.—The plough used on this farm and in the neighborhood is the Beverston plough, invented by Mr. Tugwell. Wooden mould-boards are much in use, particularly where the soil is adhesive, as it does not stick so much to wood as to iron. The plough is short, with one wheel, and made of wood. It is worked with three horses, or four oxen, although one horse ploughed, in four hours and thirty-five minutes, one acre of two-year-old clover, before the committee of the Bath Society, in this neighborhood, in 1808. Iron ploughs have been introduced in this district; but the first cost and the difficulty of repairing them prevent their general adoption. Lord Somerville's double ploughs are used for ploughing the turnip-land a second time in spring: they are drawn by six oxen or four horses; and, where the work is light, they are of great advantage, as they get over the work twice as fast as the common plough. Both horses and oxen, when at work in the plough, are yoked before each other and walk in the furrow. The oxen do most of the ploughing; the horses, the harrowing, carting dung to the field, and corn to the market.

Thrashing.—The wheat only is thrashed with a machine, which does at the rate of ten or twelve quarters a day. It is driven by four horses, and four men, three women, and a boy are required to attend it; so that as many hands are employed as would be required to perform the operation with the flail; and the expense is, at least, as great. The only advantage of the machine is, that the work can be done in a much shorter time, and that a saving is effected in the quantity of the grain. The oats, barley, and beans are always thrashed out with the flail.

Manure.—The improvement of the soil which he occupies ought to be the object of every farmer. Land, in a natural state, if dry, undergoes a gradual improvement from the yearly growth and decay of the vegetable substances which grow upon it. But if the vegetable substances that grow upon it are eaten off by sheep, which drop their dung in return and in small portions at a place, the improvement goes on much more rapidly. Hence

land, that is always pastured by sheep, is always improving, while that which is always mown is deteriorating. The number of sheep, therefore, kept on this farm, tend much to its gradual improvement; and the regular deposition of the sheep's dung over so great a portion of the farm, every year, in consuming the turnip crop, is an excellent preparation for the course of cropping that is to follow. The double manuring which the land thus gets, in the same year may be thought by some to be too much; but the land of this farm and of the whole district is so thin and brashy, that it can hardly be overdone with manure.

Nearly all the manure that is made on this farm being applied to the land that is prepared for turnips, is generally carried out into the field, which comes in course for the crop, in the end of autumn or in winter; it is laid upon road-scrappings and other earth, that has been previously conveyed to the place, and is well mixed with them by turning the whole over with the spade. This is generally done twice, to get the whole well mixed and rotted, it being found by experience, that well rotted dung is the best manure for turnips on this land. The dung from cow, ox, and young beast-courts, from the stable-yard, and what is made in the sheep-lambing fold, are all carried to the field, intended for turnips, and prepared as above described. Besides this and that which is dropped by the sheep, when folded upon turnips and vetches, the ashes produced from the paring and burning of the old saintfoin, when it is broken up, and from the stubble that is overrun with black crotch, when it is pared and burned, act as a manure, and are an excellent preparation for turnips. If the ashes are abundant, they produce a crop of these, equal if not superior to what would be produced by fifteen loads of good rotten dung.

Proper size of a farm.—Of late years large farms have been cried down, as depriving the laboring class of employment; and much has been said on this head, without, as it appears to us, due examination into the subject. If we look at the number of hands that are constantly employed on this farm, and compare it with the number employed on a number of small farms, which together would make thirteen hundred acres of land of such kind and quality as this is, we have no doubt but that the number on Beverston farm would be found much the greater. The large farmer has capital sufficient for all the expense required to cultivate his land properly, and in a proper time; but this is not always the case with small farmers.

Small farms are generally let at a greater proportionate rent, it is said; if this is the case, the landlord, on the other hand, is put to a greater expense in erecting buildings, &c., and the rents are generally worse paid than those of large farms. Mr. Hayward's opinion with regard to the size of a farm is, that "it cannot be too large, if it be well done to; nor too small, if not well done to."

Tithes.—The tenants of this parish have a lease of the tithes for fourteen years, at a corn-rent, the yearly average price of corn determining the sum which the tenant has to pay for his tithes. This is an excellent arrangement, and if the tithe-question were settled in this or some similar way, a great agricultural improvement would follow, sufficient perhaps to give to England a supply of corn sufficient for her population, and enabling her

to export what she at present imports. The tithes of arable land might be valued at so much wheat, barley, oats, or beans, according as the land might be fit for the production of such crops; and the grass-land, at so much cheese, or beef, and mutton, according as it might be fit for a dairy or for fattening sheep or oxen; and the sum to be paid to the clergyman settled every year, according to the average price of the several articles.

No circumstance retards the improvement of land more than the present mode of exacting tithes. Nothing can be more galling to an industrious man, than that, when he has laid out a large sum on the improvement of his farm, and it is beginning to yield him an increased return, the tithe-man should come and take the tenth of the fruits of his industry, capital and talent. "The tenth of the natural produce," say many, "belongs to the church;" but surely it never was intended, and certainly it never was justice, that the church should take the tenth of that which is produced by artificial and expensive cultivation, without also bearing a tenth part of the expense of such cultivation. This seems clear and evident, to all farmers at least. "If (such is their language) I lay down my land to pasture, you will not receive one-tenth part of the tithes you now take: what sort of right then have you to the tithes that are produced by expensive cultivation?"

If a field of pasture, the produce of which is worth five shillings per annum, is broken up and improved by draining, &c., at an expense of 15*l.* or 20*l.* per acre, and in consequence, produces an annual return of 5*l.* per acre, can there be any reason or justice in the church's having a right to demand and receive twenty times the sum she received when the land was in poor sheep-pasture? Surely not: for it is the great expense of artificial cultivation, that the farmer has been at, which has produced this great return. The land is worth little, if any more, to the landlord than before; and if the supposed new mode of cultivating it were to be discontinued, it would return to its original value.

Rent and profits.—The rent of land and the profits of the farmer arise from the excess of the value of the produce over the expense of cultivating it,—the rent belonging to the landlord, and the profits to the farmer, in return for his capital, and for his skill in farming. When all circumstances, connected with agriculture, are in a natural state, the price of labor and the expense of cultivating the soil will rise and fall, as the price of the produce of the soil rises and falls. But the impolitic interference of government with circumstances that bear upon the price of produce, has had the effect of lowering the price of produce, without, at the same time, lowering the price of production. Hence a great portion of the poorer soils has been thrown out of cultivation, because the expense exceeded the price of all the produce. Such has been the case with respect to all the poor, thin, clay land of Beverston farm; which is now employed in breeding young cattle, there being little expense attending this mode of reaping the natural yearly produce of it. The rents have thus been greatly reduced, the profits have almost entirely disappeared, and left the agriculturist to live upon his capital. Unable to cultivate his land in the way he was accustomed to do, he endeavors, by cross-cropping it, or cropping it out of the regular course, to make up by increase of crop the

deficiency of the price,—a mode which has the effect of ultimately diminishing the produce and impairing the powers of the ground, which gets worn out and overrun with weeds; so that the expense of putting it "in place," or in good condition again, will be much greater than what would have kept it in good condition.

Thus, the instability of our corn-laws, and of the circulating medium of the country, has not only destroyed much of the property of the agriculturist, but has paralyzed the farmer's operations, deteriorated the quality of the soil, and made the agricultural improvements of this kingdom retrograde, to a degree unprecedented in the annals of agriculture. It has undone all the improvements that have been made since 1796.

The present distressed state of agriculture is felt by every one connected with it either directly or indirectly. The laborer is distressed, because there is no demand for his labor;—the farmer, because the price he gets for his produce does not enable him to meet the demands upon him;—the landlord, because the rent which he now receives will not enable him to support that rank in society which he used to hold, while he views with dissatisfaction the elevation which the money capitalist has attained in consequence of impolitic interference with existing laws.

It is only by descending from the character and standing in society which they held previously to 1820, and by the strictest economy and most industrious habits, that the farmers can now get both ends to meet; for, although their rents are lowered, yet their expenses, together with the growing evil of the poor-rates and other parochial taxes, are as great in all parishes, and in those adjoining the manufacturing districts they are much greater.

Accounts.—The mode of keeping the accounts on this farm is simple and correct. All payments of rents, tithes, poor-rates, taxes, tradesmen's bills, &c., are entered as they are made, and the expense of labor as entered weekly. This forms the account of disbursements. In the weekly account for labor, the number of hands employed—the wages they receive, whether by the day or the piece, with the kind of work they are employed in, are all entered, so that the expense of the turnip crop, the hay harvest, the corn harvest, paring and burning, &c. for any year, may be known at a glance.

A separate account is opened for the receipts. In this account an entry is made of every thing as it is sold, specifying the persons to whom and the price at which it is sold,—also the quantity, whether of sheep, beasts, cheese, butter, corn, &c. This forms the account of receipts; and the balancing of this with the former shows the profit or loss of any year.

NOTES ON EUROPEAN AGRICULTURE, BY A CHARLESTONIAN.

No. 3.

From the Southern Cabinet.

Wheat.—In my last I gave some notes on the rotation of crops in Great Britain,—a judicious mode of culture, which is now adopted to a con-

siderable extent in Sweden, Denmark, and the grain growing countries in the north of Europe. Thus, the soil, although it does not annually give the same kind of product to the cultivator, is never idle, but produces in succession crops which are often more valuable than wheat itself.

As however wheat is not only one of the staple articles of Europe, but also for our own country, I propose to devote this article to a description of the method of culture.

1st. Preparation of the soil.—The wheat crop, as I have stated in a former chapter, usually succeeds the fallow crop, which consisted of potatoes, beans, or turnips. This fallow crop is always richly manured. Stable manure is in a majority of instances used, and in most soils is preferred. It is spread on the fields broad cast in the proportion of twenty or twenty-five tons to the acre. In about half the cases it is scattered over the fields in the early part of the winter, and ploughed under in December. Where time is wanting the manure is not applied till early in the spring, which, I am informed, answers equally well. Lime is much used on light sandy soils. In some parts of the coast of Holland, where the soil is poor and sandy, the application of lime has given a dark, rich color to the earth, which now retains its moisture and produces abundant crops. On the sand lands between Berlin and Dresden, resembling our Carolina pine-barrens, I noticed it used in some fields with very beneficial effects. Similar results have been produced in New Jersey by the application of lime on bare sandy soil. Bone dust is much used in England on light soils. It is generally procured from the continent. A few mills for the purpose of grinding the bone for manure exist in England and Scotland, although they did not fall under my notice. A model of one exists in the agricultural museum of Edinburgh, which was politely exhibited to me by Professor Lowe. The construction is very simple: but as I believe it is well understood in the United States, and as I am not much of a mechanic, I need not venture on a description. The bone dust is used in the proportion of twenty-five bushels to the acre; a greater quantity has not been attended with any increased beneficial results. It is sown broadcast on the land: sometimes mixed with turnip seed. Night soils, (a very valuable manure,) are limited to the neighborhoods of towns, and principally applied to gardens. This article is prepared in the vicinity of Paris by a method rendering it not in the least offensive. It has the appearance of large, dried bricks, which are broken up when wanted, and applied to the land in the manner of bone dust.

When the fallow crop has been removed, the ground is ploughed and put in order for the reception of wheat: occasionally some manure is added, but it is in general believed that the ground is sufficiently enriched for the ensuing crop. The ploughing is similar to that of our own country. The wheat is sown from the middle to the end of October, generally in drills, but sometimes broad cast. The sowing or drilling of the wheat does not complete the labor till the time of harvest, as is the case in America. The wheat is regularly hoed between the drills two or three times, and when the wheat is about a foot in height, it is carefully weeded,—hence we seldom find in English wheat either cockle, cheat, or the seeds of the va-

rious weeds with which our fields are so often infested. The wheat is usually gathered with the sickle. I saw no cradles, like those of America, in use.

2d. Quantity of seed to the acre.—In this particular I found a great difference of opinion between the British and American farmer. In this country a bushel of wheat is usually considered sufficient for an acre; formerly many persons only used three pecks per acre. I am inclined to think, that we have erred in using too little seed. I remember visiting the fields of a farmer in New-York many years ago, and observed that whilst the heads of wheat were very fine, the stalks appeared to stand very thinly on the ground. He had sown three pecks to the acre, and the produce was nine bushels. I suggested to him the propriety of using a double quantity of seed. Three years afterwards he sowed the same field again, using a bushel and a half of seed to the acre,—the season and tillage were similar to that of the former sowing. He subsequently informed me that his land this year produced fifteen bushels to the acre, and that he was now an advocate for thick sowing.

I extract from my notes on English husbandry the following quotation, which I either wrote down from the dictation of some responsible agriculturist, or copied from some agricultural journal of England: I am inclined to think the latter. I have reason to believe it is the usual mode adopted in England and Scotland.

“On rich lands in good condition, when the soil is strong loam or clay, and well drained, two and a half to two and three-quarter bushels per imperial acre may be sufficient, of the ordinary varieties. As spring sown wheat does not tiller well, one half to three quarters of a bushel more may be necessary; but strong clays are not well adapted to spring sown wheat, although it is quite possible that a suitable variety may be obtained for that purpose.

“On medium soils one half-bushel more may be requisite for such season of sowing, regulating the quantity to the quality and condition of the soil, and the preceding crops. When potatoes have been raised in the fallow division, at least two or three pecks more may be necessary than after a clean fallow.

“On high and light lands, wheat, after fallow, should be drilled in from two to three inches deep, to prevent throwing out in spring. With this precaution, if the land is in good condition, little more seed will be wanted than on medium; but on such lands wheat holds best after grass, and in that case requires two or three pecks more seed than under any other circumstance.”

As I have never seen the stalks of wheat so thickly crowded together in my own country as in Great Britain, and as their average crop is decidedly greater than ours, I have accounted for the difference, at least in some measure, to the greater quantity of seed used by the European agriculturists, after making due allowances for the difference of climate and modes of culture. I remarked, that in England, in consequence of this thick sowing, there was but one stalk to each grain, whilst in America where the seeds were farther separated, there are usually side stalks, few of which produce equally well with the one proceeding from the grain. The additional quantity of seed sown is doubly compensated for, by the greater product to the acre. These, however,

should be matters of experiment with us, in a climate where our summers are much warmer, as I am fully aware that lands may be too thickly as well as too thinly sown.

3d. *Varieties of wheat in Europe.*—Botanists have been much perplexed in endeavoring to decide on the true origin of our varieties of wheat. It is now difficult to ascertain what is the true *triticum sativum* or common wheat. In general the bearded and beardless wheats are divided into two species. The former are termed *triticum hybernium*, or winter wheat, and the latter *triticum aestivum*, or summer wheat. I am, however, inclined to think that all the varieties may be included under one species, as there are no distinctive marks by which they can be separated. Under *triticum hybernium*, for instance, are included several of the earlier and the best varieties of spring wheat, and under *triticum aestivum* are included several bearded wheats equally hardy, and requiring as long time to arrive at maturity as our common winter sorts. Indeed, the recent French botanists have now referred all the varieties to *triticum sativum*. But this is not the place to settle nice botanical distinctions.

Spring wheat is seldom cultivated in England as a general crop. In every instance where I saw it growing, it appeared to me rather inferior.

In my last number I alluded to some of the varieties of wheat at present cultivated in England. The golden drop, blood red, Uxbridge, Hunter's, Mengoswell's, Whittington & Hickling's. The three latter, like our okra cotton and rohan potato, have been so recently introduced that they have not yet found their way into general cultivation. The specimens, however, which I saw were very superior, sufficiently so to encourage the American farmer to import the seed, which may be ordered from Lawson and Sons, Edinburgh, or Lodige, in London, or through any merchant at Liverpool. An order sent in July will be in sufficient time to enable the farmer to plant the seed in autumn.

The wheat called Leghorn or Tuscany wheat, was introduced into England for the purpose of procuring straw for the manufacture of bonnets, &c.; but it was found not to succeed as well as the common rye, which is now exclusively cultivated in the Orkney islands, and the north of Scotland, for that purpose.

In the northern parts of France, I saw cultivated pretty extensively, a very hardy variety of wheat called *Poulard bleu*, and *blé bleu conique*. It is partial to rich clay soils; its grains are dark and very hard. An Egyptian wheat called *Blé de Smyrna* was also highly spoken of. There is a variety of wheat brought originally from Morocco that is successfully cultivated in Italy, but does not succeed well in the northern parts of Europe, that might be experimented on in our southern states. Its spikes are long, loose, nodding to a side, and awned; grains about half an inch in length—reddish, transparent, and very hard. It usually goes under the name of Polish wheat, although it is not much cultivated in Poland,—is said to have come originally from Morocco, and is often called Mogadore wheat.

I find in my journal, descriptions of nearly one hundred varieties of wheat cultivated in Europe, but doubt whether the transferring them to your pages would be of any material benefit to the

American farmer, who, I fear, would scarcely import them even as an experiment. Should the seeds which I brought with me, and distributed through several parts of our southern country, be successfully cultivated, I will endeavor to notice them on some future occasion.

It would be of great advantage were our agricultural societies to imitate the examples of those of Europe, in attaching a museum to their institutions, where not only the different grains cultivated might be exhibited, but also the stalks and plants preserved in a dried state,—the mode of culture and product carefully noted, for the benefit of agriculturists. I observed at Washington, during the last summer, a successful attempt of this kind by the intelligent superintendent of the patent office.

The English farmer has more to apprehend from the constant drizzling rains during harvest time, than from insects, which are the bane of the American farmer. The so called Hessian fly, has never been introduced, and the poor Hessian has sins enough to answer for on another score, without meriting the charge of conveying this pest to America in his straw. The insect is not known in Hesse, and although two specimens were shown to me as having been procured in Sweden, they proved to be of a different and harmless species. I fear we will have to claim it, along with the opossum and rattle-snake, as exclusively American. The wheat of our country also suffers materially from other insects, which prey upon it, in its ripened state; hence in many parts it is necessary that the crop be not only thrashed out, but immediately carried to the flower mill. In England, on the contrary, I perceived stacks of wheat that had remained unthrashed for three and four years, and in many instances five or six, without any other molestation than that of the Norway rat—that cosmopolite, gregarious, omnivorous pest of all countries.

There are two of the sciences, however widely removed from each other, and however seldom thought of by the American farmer, that have long appeared to me as inviting greater attention in an agricultural point of view than has hitherto been devoted to them, I mean chemistry and entomology. The former enabling us to analyze our soils, and directing us as to the best modes for their improvement, and the latter in pointing out to us the habits and characters of those insects that prey upon our fruits and grains, without which we cannot find a remedy against their depredations.

From the London Gardener's Gazette, Feb. 22, 1840.

A PLAN OF GREEN CROPPING.

Successfully pursued for a number of years by Robert Walls, overseer at Roselle, Ayrshire, N. B.

Early in spring we plough and harrow and weed our land for green crop till we have all the weeds off, then roll it to keep in the moisture; for in dry springs it is very difficult to do so. We let the land be in that state till we are ready to sow our Swedish turnip, which is generally about the 10th of May. We study to have them all sown by the latter end of May, if possible. Immediately before we begin to sow we give it what we call the last furrow, from seven to ten inches deep, as we

find the soil answers; but in doing this, we always harrow and roll every night in dry weather before we leave it, merely to keep the moisture in the ground; then in the morning we have our land ready for drilling. We make our drills from six to eight inches deep, and from twenty-six to twenty-seven inches apart. Then we put in our bones or dung, or whatever manure we intend to give; if bones, we cover it as light as possible, not above three inches deep; if dung, we generally cover it deeper, so that we may have about three inches of earth above the dung after the seed is sown. We always sow as soon as possible after the land is drilled up. If we are drilling and manuring for a whole day, we always sow in mid-day and at night, so as to preserve the moisture in the ground for our seeds. In sowing the Swedish turnips we always give nearly 5 lbs. per acre, and put the seeds as deep in the ground as the manure will admit of, not to bring it above ground by the coulters of the machine. We always study to have the seed from two to three inches below ground, and amongst the manure if possible. This being done, and by the time the seeds get above ground, they have a strong hold of the manure; and by the time the fly gets hold of them they are nursed at the root by the manure, that the fly and drought has no chance of hurting them. I have always found this plan successful in the very worst of till, after being drained. By care being taken to harrow and roll as soon as the land is ploughed, to procure a fine mould, and there is no doubt of procuring a crop every year with the first sowing. There has been great difficulty in this case in this country for a number of years past, the turnips being sown as often as three and four times in one season, and as often carried off by the fly. I believe, in most cases, the evil is occasioned by sowing the seeds too near the surface, and not down to the manure; and by sowing so shallow the seeds will blight, perhaps in two or three days; and if it is a dry scorching sun, they are sure to go off by the fly—they have no hold of the manure to carry them on. But in a damp time there is less to fear of their being carried off. By the seeds being sown as before mentioned, they will be from six to ten days before they blight, and they will be observed coming up quite strong, making a crack in the top of the drill and having a strong hold of the manure, they come on so rapidly that the fly is not fit to hurt them. But by sowing them shallow, though successful, and not carried off by the fly and drought, the plants are far longer sickly and do not come away so fast, nor to the same maturity, as if sown as before mentioned. When we sow any other kinds of turnips,—say hybrid, or red-top Aberdeen,—we do not give more seed than 4 lbs. to the acre, as the seed is smaller, and sows farther; but we sow them on the same plan as before mentioned. We generally sow Dale's hybrid, and the Aberdeen red-top yellow. We find them the best sorts. We have made it our practice, for a number of years past, to try all sorts that we heard of, and we consider these two sorts the best. In sowing our turnips, we generally sow Swedish in the first part of the soil. If there is a more stiffish part in the field than another, we sow red-top Aberdeen, or Dale's hybrid, as we find either of these sorts answer a stiffish soil better than the Swedish turnip.

In preparing our dung for turnips, we generally collect it into large heaps in the fields during the winter; and we generally give it two turnings before we put it into the drills. We study to have it well rotted before it is used, and give it the first turning about the middle of April or the end of March, and the last about eighteen days before put on. We study to have it with as much moisture as possible. We make it our study to collect all the urine that comes from the stall-fed cattle, and drive it to the dunghills in the field; and when we are putting the dung out, if we find it has not enough of moisture, we drive water from the nearest part to the dunghill. We consider the dung being put into the drills with plenty of moisture, is a great benefit to the crop in dry spring, both for turnips and potatoes.

[Sir,—Above I send you a copy of an essay, which, I think, should be interesting to your agricultural readers. A premium of £1 was awarded to it by the Ayrshire General Agricultural Association: it is from a very intelligent practical man. Archibald Hamilton, esq., of Caroline, his master has spared no necessary expense on the lands at Roselle; they are completely drained, subsoil ploughed, and levelled, and so clear of weeds that the whole estate has more the appearance of garden than farm ground; and as it has been frequently asserted that such high keeping does not yield a remuneration corresponding to the outlay, I took the liberty of inquiring as to this point, of the writer of this essay last summer, when he informed me his opinion was, that when judiciously managed, the outlay in such cases yielded a far greater return than could be obtained from more stinted management; and he stated, as corroborative of this opinion, that the preceding season, viz: 1838, their crop of turnips was 35 tons per acre, which sold at 24s. per ton, and other crops in proportion.]

R. I.

Kilmarnock, Feb. 18, 1840.]

TO DESTROY TICKS IN SHEEP.

From the English Farmers' Magazine.

Sir,—In reply to a letter in the Mark Lane Express of the 20th of January, inquiring for the best application for destroying the tick in sheep, I have to recommend animal oil, usually produced from the distillation of bones, and which can be purchased for a mere trifle in most large towns. A very small quantity applied to each sheep will be found completely efficacious, as in addition to the repugnance which insects have for oil, this oil possesses a most disagreeable and powerful odor.

If a small quantity of this oil were mixed with a large quantity of manure, and spread over ground sown for turnips, it would effectually keep off the fly, that determined enemy to the young turnip plant.

I wish to plant some waste land, in an exposed situation near the sea, with young trees; can any of your correspondents inform me what is the most profitable plant, and how many years they will take in coming to perfection. It is right to add that the ground is very steep, and the climate mild, but damp. I am informed that pear trees, mulberry trees, and larch are the most suitable.

I remain, sir, your obedient servant, W. S.
Jersey, Jan. 24, 1840.

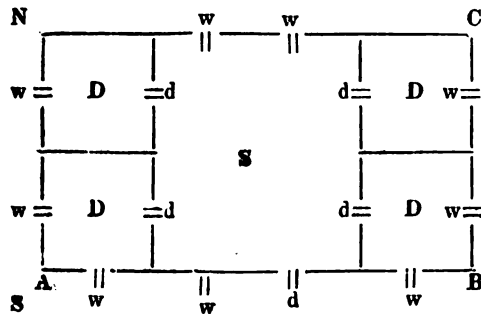
STOVES FOR NEGROES' DWELLINGS.

To the Editor of the Farmers' Register.

Amelia, March 3, 1840.

One of the greatest obstacles to the improvement of our farms in this part of Virginia is the time and labor necessary to collect fuel for ourselves and slaves. This, on almost every large farm, occupies, during the winter months, nearly all the force and all the teams of the estate. Thus we have, comparatively, no time for the accumulation of the means of manure, or the distribution of it when made. I will suggest a plan that will secure to our slaves as much comfort as at present, and at the same time save their masters the endless vexation of always cutting and hauling wood. It is simply to substitute stoves in place of the eight-foot fire-places, which consume a log at a firing. From accurate experiments during the last five years, I have found that a stove would consume, in a given time, but one-tenth the wood of a common fire-place, whilst the general warmth and comfort of the room was four times as great. Thus the total gain was as one-tenth to four. But to my plan.

Let a 40 by 20 feet house be put up; the basement frame or brick, (I would prefer the latter,) 10 feet pitch. Divide this by cross partitions, so as to leave the centre or stove room 16 by 20. The end rooms will of course be 12 by 20. Divide these again, so as to make of each two dormitories 12 by 10. Thus the ground floor will consist of four lodging rooms, two on each side of the stove room. In the centre of this middle apartment or stove room, have a cheap cast iron stove, with a pipe sufficiently long to extend through the roof of the house in a vertical position. Such a stove and pipe can be bought and fixed for \$12, or at the utmost \$15. The garret might also be divided, if desired, into four or five sleeping rooms. I would have all the rooms properly ventilated, by windows at proper distances. I annex a diagram to illustrate my views.



A B, Southern front, 40 feet.

B C, Eastern breadth, 20 feet.

DDDD, Dormitories, 12 by 10.

S, Stove room, 16 by 20.

d, d, &c. Doors. w, w, &c. Windows.

Such a building would cost but a trifle in comparison with the saving it would effect. The stove room would accommodate comfortably 32 persons, and the four lodging rooms on the first floor, and the four garret rooms would easily lodge this number. To accommodate this number of slaves, upon the present plan, with fire, would re-

quire eight fire places; but I have shown that each fire place will consume at the minimum 10 times as much fuel as a stove. Hence the total gain in fuel will be as 80 to 1. Or 1 load of wood will upon this plan keep 32 slaves as comfortable, and for as long a time, as 80 loads upon our present system. I need not point out to him who groans under the unceasing toil of providing fuel for his slaves, the great benefit of diminishing his labor eighty fold; nor need I advert to the humanity of an arrangement, which would secure to every slave, however old and decrepit, comfort and warmth at all times. I proceed to notice some of the objections which I foresee may be made to this plan.

1st. Some will say that the negroes will be unhealthy. This I deny, and I think my experience bears me out. During the last five years I have principally used stoves for warming my school room, (during a large portion of the time stoves only,) and I have never perceived any injury from this cause to my own health, or to that of my pupils. I have generally had about thirty boys under my care; and the average amount of doctors' bills, for the whole school during the five years, has not exceeded \$15 per annum, and no portion due to the stoves. Again, it is notorious that north of the Potomac, in the middle and eastern states, nine-tenths of the middle classes use stoves, without injury to health. For my own part, I sincerely believe that stoves are more healthy than fires, because of the uniformity of temperature that may be induced and continued.

2dly. Some may say that there will be cruelty in debarring slaves the light of a cheerful fire. If so, and no light-wood knots are convenient, provide a lamp. The cost of this will not exceed ten dollars per annum, and may easily be defrayed from the gain in fuel and labor.

3dly. Others will object to congregating so many negroes together under the same roof, and to the danger of infection in case of disease. I answer, that I consider it better and more humane that they should be together. In this way, by appointing a head man, a master may at night keep his slaves under the best control; and, by making him accountable, keep his negroes at home, unless absent by leave. It is a sickly philanthropy which induces us to give our negroes a *carte blanche* as to their doings and goings at night. How much better and more humane would it be to keep them, after a day of toil, resting at home, than, as at present, to permit them to prowls over half the neighborhood in search of pell or whisky? Hundreds of slaves are ruined by these nocturnal visits, whilst the masters' horses are rode, the masters' corn or pigs stolen, to gratify their passion for liquor, and swell the gains of some neighboring dram-seller. My plan would prevent all this. Make your head-man accountable to you, that the negroes be all in place at a certain hour, and also, if necessary, make him lock the door, and keep it locked, after that hour. The liability to disease and infection would be little or none, if due attention were paid to keep the rooms and premises clean. We all have old women, good for nothing else, whose business it might be to attend to this. Moreover, a convenient house might be appropriated as a hospital, into which each negro, as soon as taken sick, might be removed. This, the universal practice on the large West Indian estates,

when slavery existed there, would be a good plan even at present.

4th. As to the expense of such a building, I calculate that it would not at the utmost exceed \$500. At double this, it would, by saving, pay for itself in less than four years. We all feel that the two greatest obstacles to improving our lands in this section of Virginia are, the fence laws and fuel getting. As to the first I despair, now that our constitution has been amended, ever to see it removed; but surely we may, by judicious economy, rid ourselves in a great measure of the latter. The plan I propose, if pursued, would enable us to employ our teams and hands during the winter in making and hauling manures, preparing for a crop, &c. Our oxen would be relieved from the four months' purgatory they now annually undergo, and in the spring of the year, instead of being, as now, almost unable to shake their tails, would be sleek and fat, and ready for any work on the farm. The farm itself would no longer be cut up with ruts and roads in all directions, nor have its woods pillaged of all valuable timber.

Admitting, however, that the expense of appropriate buildings is too great for many to encounter, the same advantages, though in a less degree, apply to the use of stoves in our common cabins. The saving, even in this case, both of fuel and labor, would be immense. There would be no need, where old field pine could be had, of ever cutting a stick of forest timber for fuel. I have found that dried pine is in all respects the best fuel for stoves. One week's work, the winter preceding, would secure an ample supply, even for a winter of as intense cold as the last. The saving of labor by this plan all must see and admit; the saving of fuel will appear to some, who have none to spare, equally beneficial. It is evident to all, that without reform in many particulars, our dear mother state must go on declining. We complain of the tariff, the banks, or the administration, as the principal causes of our present embarrassment and difficulties. It is neither the one nor the other; but our own habits of prodigality and expense. If we would curtail these, economize our time, talents, and labor, mind our farms more, and politics less, we should soon cease to feel the pressure of poverty and the perplexity of debt.

WM. H. HARRISON.

REVIEW.

MAISON RUSTIQUE, DU XIX^e SIECLE. Paris, 1836.

ART.—*Education de Vers-a-Soie.*

The "Maison Rustique," a French work in four large volumes, contains the latest European treatise on silk culture that we have seen. The writers of the different parts of the treatise on the rearing of silk-worms, to which our remarks will be confined, are Loiseleur-Deslongchamps, Bonafous, Chapelain, and Deby, whose names are subscribed to their respective portions. We were curious to search in this treatise for the latest opinions and

practices on this subject. We shall present merely such views as differ from earlier or established authorities, or such passages as may exhibit any thing of novelty, passing over the greater portion of the treatise where there is general agreement between the writers and their most respected predecessors.

The dimensions and plan of a *magnaniere*, or cocoonery as termed in this country, is given in detail, and with a figure of the horizontal plan, which prevents the possibility of mistake of the author's meaning. The plan shows an apartment of 30 feet long, 16 wide, and 12 feet high, inside measure.* There are 4 rows of shelves, (running across the smaller diameter,) of 5 feet width, and 12 feet length. The shelves are in tiers of 2 feet apart, and of course 5 tiers of shelves, or 6 counting as the lowest shelf the floor beneath. These shelves, including the same space of floor beneath them, amount to 1440 square feet; and this space the author (Deslongchamps) says is enough to accommodate, in the last age, the worms from 6 oz. of eggs, which is 240 square feet for each ounce. He says elsewhere that—

"In almost all the countries where silk-culture is usual, the ounce of eggs does not make but four-fifths of that of Paris, or *poids de marc*; the Italian ounce is still less, containing but 39,168 eggs, according to Dandolo; that of the south of France is about 40,000, and that of Paris is very near 50,000."†

* These measures of length, and all used in our translated extracts, are French. The French foot is equal to 1.07 very nearly, of the American foot. Twelve inches make the French foot, and 12 lines the inch.—Ed.

† This statement of weights is incorrect. Supposing that Dandolo's quantity of silk-worms' eggs (quoted above by the French author) is correct, that is, 39,168 to the Milanese ounce, the following will be the numbers of eggs to the French ounce, and also to the English or American.

39,168 eggs to the Milanese ounce (=420.298 English grains.)

44,033 " " Paris oz., 16 to pound *poids de marc*, (=472.5 Eng. grains.)

40,771 " " English or American oz., *avoirdupois*, (=437.5 grains.)

The value of the Milanese ounce is calculated by the table in the original work of Dandolo (4th Ed.); those of the Paris and English weights are taken from the table in Ure's 'Dictionary of Chemistry.'

The weights of various small parcels of eggs given from our own counting, at page 95 of Farmers' Register, exceeded the above considerably, there being, of most of the kinds, between 37 and 38,000 to the *avoirdupois* ounce, whereas, according to Dandolo, there should be 40,771. The difference probably was caused by his samples being of well washed and perfectly clean eggs, while ours were merely scraped from the cloth, and retained nearly all the dried glutinous matter,

It is this latter weight (*poids de marc*) that is used throughout. Then, if all the worms were raised, (which he supposes to be in an ounce, and as we think incorrectly,) there would be 208 worms to the square foot, (and one-sixth of the worms being on the floor); or if half that quantity only be reared, there would still be 104 worms to the square foot; a number nearly double of what is deemed safe by culturists in this country.

Next, it is to be observed that the passages between the rows of shelves are only 2 feet wide, or less than half the proportional width usually deemed requisite, the shelves being as wide as five feet. It is true that the tiers of shelves are farther apart than usual in the United States, (being 2 feet one above the other,) but considering that the floor serves for the lowest tier, this distance of the shelves lessens the evil of crowding but little.

We are far from advising such contraction of space as recommended in this treatise. But proceeding as the recommendation does from a writer distinguished for his intelligence and his long continued devotion to this subject, and having much practical experience, it may be fairly inferred that if narrow passages between the wider shelves were so very dangerous as supposed in this country, Deslongchamps would at least have been able to suspect the existence of the evil. It should however be remarked that the small size of his building, compared to those planned in this country, and the consequent near supply and free entrance of the outer air, through the windows, must be better for ventilation, than passages of triple the width of his in an apartment of 100 feet by 30, or more. We fear much for the results of rearing worms in the large sized buildings which are preferred by the most zealous beginners in this country.

M. Deslongchamps was the first person in Europe (though not in America) who recommended several successive crops of silk-worms in the same season, by retarding the hatching of the eggs for the latter crops. His first views on this practice were translated for and published in the *Farmers' Register*, at p. 381, vol. iv. This subject he has doubtless investigated and urged with all the ardor of one claiming a new and important discovery, and aiming to maintain its value by conclusive experiments, in opposition to the opinions of all the scientific as well as the merely practical culturists. It is therefore the more interesting to hear the latest opinions of this writer. The system of successive and retarded broods is universally acknowledged as safe in this country; and it is as much and as successfully advanced in practice as

which serves to make them adhere so closely to the cloth whereon they are laid.—ED. F. R.

any other part of this infant industry. But the proper and safe manner of preserving the retarded eggs, in ice-houses, is not settled, and there are few who would trust to the *entire exclusion of outer air* from the eggs, as proposed by this writer. Yet, if he is correct in this opinion, it is of great importance that it should be known and acted on. For by closely stopping up the eggs in glass or other air-tight vessels, they would be secured from dampness, and might be kept buried in ice, for any length of time, with little trouble, and safe from all sources of injury or loss. Our author says—

"We may preserve the eggs, and put back the time of their hatching, by placing them in cellars or quarries, of which the temperature is low, and varies but little. From numerous experiments in trials of multiplied rearings, to which we have been devoted, we have demonstrated that, in ice-houses, the eggs may be preserved at least all the summer, and during a time the limit of which we have not yet been able to determine. In every case, in order to guard the eggs from the influence of moisture, it is essential that the cloths to which they adhere should be placed in glass or earthen jars, of which the mouths should be sealed so as to be perfectly air-tight."

Of the choice of eggs, in general, and the causes of injury from their bad quality, the author thus speaks:

"To have productive rearings of silk-worms, the first thing necessary is to procure good eggs. Those produced by each culturist should be considered by him as *the best*, because that he is sure of their quality and condition, and that sometimes he would be deceived in that respect in buying from other persons. However, when unprovided, it is proper, in procuring eggs, to obtain them from the region most advantageously known in regard to the silks they furnish to commerce."

The last words are but another mode of expression for the region where silk-worms thrive best, and are most healthy and productive. This recommendation is very important to this country especially, where so many new beginners will be obliged to provide their first stock by purchase, and from unknown or doubtful sources.

There is a ridiculous opinion generally existing and operating in Europe, which this author as well as his enlightened predecessors have condemned—that is, that in every location it is necessary to change the eggs of silk-worms, from one place to others raised elsewhere. On this Deslongchamps says—

"This prejudice could only exist in districts where suitable climates for raising silk-worms; for it is unnecessary to change the eggs, as they can be improved (from one place to another) at a certain point, by the use of the *silks* (silk-worms) fed with the *rus rubra*, (the red rust), which is the cause of the disease."

made cocoons of which the hundred weighed but 1 oz. 6 gros.* The eggs of these cocoons having been preserved and hatched, we succeeded so far in regenerating and improving the stock that in 1827 the worms descended from them made cocoons of which the 100 weighed 6 oz. 1 gros 24 grains; and in 1829, 100 cocoons, still of the same race, weighed 6 oz. 4 gros."†

This last paragraph presents several curious facts, which may be very usefully applied by the practical culturist. But we have no faith in the utter condemnation of the *morus rubra* (our indigenous red mulberry,) which is implied in the author's words, and in which he but accords with many other authorities. We admit fully that this tree is much inferior to the white mulberry, and still more so to the *morus multicaulis*, for furnishing food to silk-worms. But the inferiority is not so great as to prevent the worms feeding on it heartily, and their forming good cocoons and good silk. This we have long ago and repeatedly asserted, and now repeat our advice to all who may possess this tree only, to plant a better kind, but not to wait for its growth and product before commencing their feeding operations. In addition to other facts and proofs formerly advanced by us in this journal, we will adduce another of later occurrence. In the family of Col. C. Hamblin of Halifax county, N. C. silk-worms had been reared successfully in 1837 and 1838 exclusively on leaves of the common red mulberry, and without a doubt being raised as to the food being altogether suitable. The daughter of that gentleman, now Mrs. Mettaur, continued in Petersburg, last year, this employment, which she had gained some experience of at her former residence. She raised last year a brood of about 30,000 silk-worms, under all the disadvantages of a town location, confined space, and great difficulty in obtaining food for the worms; and yet with as much success, at least, in regard to the health of the worms, and the quality of their products, as in any case that we have known. The leaves used were almost entirely of the red mulberry. The worms

were perfectly healthy, the cocoons of good quality, and we have seen the silk reeled from them, (by a negro girl who had learned at home, and who used a reel made by a plantation negro car-

penter,) and it is of excellent quality, both as to material and manufacture. Mrs. Mettaur even prefers the leaves of this despised tree to any other, because they keep fresh longer than others after being gathered; and no doubt also being prejudiced in favor of what she has had experience of only, and which had served so well. And though we are sure that this preference is misplaced, the very fact of its being entertained, after the experience of three seasons, is a strong proof that the value of the native tree is much greater than is generally supposed.

"The eggs naturally and spontaneously begin to hatch when the temperature has been maintained for about 15 days, at from 55 to 59 degrees [Fahr.] But then the worms come forth at different times during many successive weeks, and there would be no means of making the rearing regular or profitable. To obviate this inconvenience, the eggs should be kept at the lowest possible temperature until the time when the buds of the mulberry trees begin to open; then the eggs should be gradually brought to a higher temperature for hatching," &c.

We pass by the directions for the artificial heat necessary to be used in Europe for the hatching, as that is altogether unnecessary in our better climate.

In the general directions for feeding and management at the commencement of each age, the weights and sizes of the worms are stated, as follows:

"The silk-worm, at the moment of its coming forth from the egg, is $1\frac{1}{2}$ lines in length, and weighs $\frac{1}{16}$ of a grain, *poids de marc*."

"Immediately after the first moulting begins the second age; the worms are $3\frac{1}{2}$ to 4 lines in length, and weigh $\frac{1}{8}$ to $\frac{1}{4}$ of a grain."

"Measured and weighed immediately after changing their skins, the worms in commencing their third age are 7 lines in length, and weigh each, one grain."

"At the beginning of the fourth age, they are one inch in length, and they weigh 4 grains."

"In beginning the fifth age they are from 20 to 22 lines in length, and weigh from 14 to 17 and even 20 grains."

And when at the greatest size, and about to commence spinning, "their length is generally 36 lines, [3 French inches,] and with some it is even 40 lines; their weight generally is from 72 to 80 grains and sometimes 100 grains or more."

The reader in applying these and other French weights and measures, should not forget that the value of each denomination of pound and ounce, or of foot, inch and line, a little exceeds that of the same denominations of this country.

These weights and measures may be useful for comparison, to the young culturist. From the figure given of the perfect cocoon, it appears that the worm spoken of is the kind that produces the "pea-nut cocoon." This is also important to be

12	the French ounce.
92.64	are equal
1	lb.
7561	grains =
7000	" =
472.5	" =
437.5	" =
	throughout
	crops
-Ed.	

known, as there are very different sizes of worms of the different varieties, as well as of the healthy and unhealthy stocks of each variety or kind.

"If all the epochs of the rearing have been passed through successfully, an ounce of eggs may produce 100 or even reach 120 or 130 pounds of cocoons. But such products as the last are very rare; and the culturist may consider himself fortunate whose crop rises to the first named amount; for it often enough happens that there is not obtained more than 80, or even 70 pounds. As to the cocoons themselves, they are very fine when 250 to 260 weigh a pound, *poids de marc*.* It results from observations made during many years in the region long devoted to silk-culture, that there are good crops of cocoons made when the winds have prevailed from the north during the lives of the worms, and that they have been but middling, or bad, when, during the same time, the winds have blown often from south, or south-west."

The silk region referred to in this passage, of course, is the south of France; and there, from the north, blows the land or *dry* wind, and from the south, the moist wind from the Mediterranean, and from the north-west, that from the Atlantic ocean. We are well assured that there is not a greater difference between prevalence of the best and the worst of these different winds in France, than there is in favor of the average dryness of the air in the United States, and that of the best silk-region of France. A most striking proof of this assertion is presented in the following tabular statement of the proportion of losses of worms sustained in 39 rearings, compared with the very inconsiderable losses of worms sustained in most rearings in this country.

"The space required by the worms [from an ounce of eggs,] and the quantity of leaves they will eat, depend mainly upon the number of worms, [kept alive to maturity,] and that number itself is according to the health of the worms, which depends not solely upon the care taken of them by the culturist, (which, it is true, he can regulate well or ill,) but still more upon the state of the external atmosphere, which it is always difficult, not to say impossible, to modify the influence of upon the interior of the feeding apartment. It may thence be inferred that it is difficult to foresee the quantity of worms that one will lose in the course of a rearing; for, however fortunate it may be, there will always worms die, from one cause or another. Dandolo appears to have achieved a degree of success unknown before his labors; but we should probably err if supposing that it was easy to equal his results. The proof of this is, that in making rearings of not large quantity, and in which, consequently, (all other chances being equal,) it is most easy to obtain success, notwithstanding, it may be seen how variable have been the results of 39 rearings."

"In 7 of these broods we have had a loss of one-half the worms.

"In 3, of two-fifths.
 " 13, of one-third.
 " 8, of one-fourth.
 " 4, of one-fifth.
 " 1, of one-sixth.
 " 1, of one-seventh.
 " 1, of one-eighth.
 " 1, of one-ninth."

If these 39 broods were all of equal size, and each represented (for illustration) by the number 100, the entire loss above stated would be as 1236 of the original quantity 3900, or a loss of nearly one-third, on a general average. We are sure that an average loss of even half this amount in Virginia, would be considered so disastrous as to frighten the most zealous young culturist from the business. Yet, these trials being of small broods, and carefully attended to, (as may be inferred from their being so carefully observed,) doubtless the rate of loss must have been less than in the general business operations of silk-culture throughout France. Thus, the author proceeds, immediately after the above passage:

"According to this statement, when one proceeds with 10 ounces of eggs, for example, the quantity of worms to be lodged and fed during the fifth age may vary from ten to fifty and even a hundred thousand, if the total loss is of one-fifth, or one-fourth, or one-third, or even of half, *the which, in great rearings is what happens the most frequently.*"

We will close this notice with two observations on the last statements of the author, for the purpose of applying his facts to the operations of silk-culture in this country.

First. We do not consider that, as yet, even a single full and complete, and accurately observed and reported experiment of rearing silk-worms has been made in the United States, even on a small scale; nor have there been any operations sufficiently regular, extensive, and long established, to show the net profit to be counted on from the business. Both these things we hope and expect will be done during this now coming season, and, thereby, this new culture be firmly established. But without claiming that any thing has yet been done, except to obtain and diffuse light and instruction on the subject, there can be no question of this important fact having been ascertained, that silk-worms are incomparably healthier here than in France; and that a loss of worms there which would be considered not incompatible with an unusual degree of success, would here be an unusual loss, and indeed scarcely possible, with proper and profitable care used throughout. This immense advantage, caused by our drier climate, is more than enough to outweigh all our disadvantages on the score of our higher-priced labor, even if there were in truth as much difference in that respect,

* 255 to the French pound would be the same as 249 to the American pound.—Ed.

as is most erroneously alleged. If men, or other able hands were hired to pluck leaves and loed worms, we agree, there would be a great difference in the cost of American and French or Italian labor. But our infirm and idle slaves will furnish labor even cheaper than the cheapest in Europe, because its whole expense must be, and now is, paid for, whether employed or idle.

Secondly. When a loss of one-half, or one-fourth, or even one-ninth (the smallest loss reported in the 39 trials in France,) of a brood of worms occurs, and from causes operating on the whole brood, the damage cannot be confined to merely those which die, nor does the number measure the proportion of loss. Where so many die from causes acting on all, it necessarily follows that *all* must have suffered greatly; and that the surviving worms either cost much more in food, in care, and in time, or made less ultimate product, than would have been from the same number in good health and vigor. And further, it may be fairly deduced from the general existing state of things reported of France, that every existing stock of worms has become more or less degenerate, and continues to transmit hereditary feebleness of constitution, or disease, because every preceding generation of progenitors had been more or less enfeebled and degraded by the deleterious effect of a bad climate. The stocks produced from such eggs brought to this country and bred from, have generally been made still worse by the heretofore ignorant and careless management. But with correct views on this subject, and proper care, and availing of the unsurpassed healthy climate of (especially) the southern states, and with the remarkable quality of the silk-worm to receive and transmit hereditary vigor, as well as feebleness and disease, it seems likely that these insects will become individually more productive here than they have ever yet been in Europe, as well as being more profitable on the whole business.

DEVON CATTLE.

By Dr. R. W. GIBBS, Editor of the "Carolina Planter," Columbia, S. C.

There are few of this variety of stock among us. The richness of the color and the symmetry of form possessed by them are very attractive—their hardness it is said peculiarly fits them for southern soils and seasons—and their value as work cattle is not exceeded by that of any other.

In England the Devons have been much prized. Mr. Coke, the prince of farmers, whose practical judgment and persevering industry have placed him at the head of agricultural improvement, and made him literally, *the lord of the soil*, gives them a decided preference over all others.

In referring to their history we find that the

north of Devon has been long celebrated for a fine breed of cattle—and that from the earliest records they have remained the same in their essential characters. Within a few years, attention and better keep have greatly improved them.

They are of a deep mahogany red color, (if with any white spots they are reckoned impure) with a yellow rim around the eye, and muzzles of the same color. They are fine in the bone, clean in the neck, have horns of a medium length bent upwards; are thin-faced and fine in the chops, wide in the hips, with a tolerable barrel, rather flat on the sides, tail small and set on very high; they are thin-skinned and silky in handling; feed at an early age, or arrive at maturity sooner than most other breeds. They are considered a model for oxen bred for the yoke—being light-limbed and exceedingly active and quick gaited. In Smithfield market the meat is highly esteemed from its fineness of grain. They are not remarkable for size and are much less than the Durham.

Several years ago, Mr. Coke, of Norfolk, (now Lord Leicester) sent out to Mr. Patterson, of Baltimore, several pure blooded Devons of the finest specimens, and from these have sprung the stock now in that neighborhood. In Maryland the Devons are much esteemed, and several gentlemen are distinguished for their beautiful stock.

The Editor of the American Farmer, who has for many years been familiar with stock of all descriptions, considers the Devons as admirably adapted for "the Atlantic and especially the slave holding states."

To sum up, in a few words, the grounds of preference of the Devon over all other cattle for all the country east of the mountains, it may be said that, for size, hardness, and dairy properties, they are at least equal to our country cattle, while for beauty they are far superior, being all of the same deep rich morello cherry color, with a clear white handsome tapering horn, and white brush to the tail, with sometimes a little white on the udder; while for richness of milk they are superior to our common cattle, and for easiness to be broke, and quick motion under the yoke, they are proverbial.

Finally, they fatten early and quickly, and will keep up to the mark with overseer and negro treatment and short rations, under which the pampered short horn, so early to maturity, and so valuable on the rich prairies of the west, would degenerate, and fly to pieces!

The following extract of a letter received by us from a gentleman familiar with the Devons of Mr. Patterson's stock, gives the character of the cows as milkers.

"The Devon cow is not remarkable for her quantity of milk; but for its quality it excels all other breeds.

"The general daily yield when fresh is from 2 to 3 gallons—there are instances where they have given 4 gallons, but they are rare. Seven quarts of a well fed Devon's milk will yield a pound of butter, whereas of most other breeds from 9 to 12 quarts are required, so that if we measure milk by its butteraceous qualities, the Devon which yields 3 gallons a day is a pretty fair milker. But much depends, upon the treatment which a heifer receives when in calf with her first calf whether she make a good milker or not. If, while forming her first bag, she be fed copiously with succulent

food or nourishing slops, calculated to distend the milk vessels, and give volume to the udder, in seven out of ten cases a good milker may be thus made; and in order to continue the copiousness of her yield she should be milked thrice a day, and always well *stripped*; nor is it less important that she be milked until within a few days of her bringing forth her second calf. If thus treated with the first calf, to continue as a milker till within a few days of calving will subsequently become a habit with her."

The few Devons with which we are acquainted when in high condition are beautiful animals—but we can give no personal experience of their adaptation to our climate. A friend who resides on one of our Sea Islands informed us that he has a very favorable opinion of them for our purposes—that they bear heat well, and are thrifty and hardy.

Devons can be procured in Baltimore at one half the price of Durhams.

The following interesting letter we copy from the *American Farmer*.

To the Editor of the *American Farmer*:

Philadelphia, 22d Aug. 1839.

Sir,—In your paper of the 14th inst. there is an editorial article which has afforded me great pleasure. I allude to the one in which you state your opinion of the respective merits of different breeds of neat cattle. As you mention your purpose of writing more fully on the subject in some future number, I think it may not be amiss to furnish you with extracts from the notes taken by me during a residence of some months in England, so that you may have facts, in addition to those which I doubt not you already possess, to sustain what I think a tenable position, namely, that the North Devons are decidedly the best breed of cattle that can be introduced into this country.

I believe I go farther than you do in esteeming the Devons superior to the short-horns even for the fertile grass and corn lands of Kentucky and Ohio. But I do so esteem them, and a conversation I had some months since with an eminent grazier and cattle dealer from Sciota valley tended strongly to confirm me in my opinion. He stated that he had had much experience with short-horns and their crosses; that there was no doubt of their great aptitude to feed well, and at an early age, and to acquire great weight; but that there, their advantages stopped; that they did not bear a journey well. In fact, he found they lost flesh, when in a drove, about in proportion as they were well bred. A quarter bred animal would drive better than a half bred, a half bred than a three-quarter bred, and so on. Now, if the short-horns do not drive well, where is their superiority for the districts mentioned? They have not a home market to consume their cattle, which must be driven. The grazier above mentioned said the difference in loss of weight was so great as forcibly to attract his attention at a time when the short-horns were in very high favor with him. I have forgotten the exact proportionate loss that he mentioned, but it was so large a percentage as to make him very chary of starting the half-breeds in a drove. There is one point which I think the western graziers overlook in preferring the short-horns, namely, the weight of beef that can be raised on a given quantity of land or food. The

preference is given to the largest animal, the one that makes the greatest weight on the hoof. I believe the Devons will make a great deal more beef from a given quantity of food than the short-horns, but it is true there must be a few more of them to carry it.

But to the extracts:—When in Norfolk, England, I spent some time with Mr. John Bloomfield at Wareham, who has a large farm, a part of the estate of the Earl of Leicester (Mr. Coke). His farm is within 3 or 4 miles of Holkham, and is acknowledged to be one of the best managed of the estate. Mr. Bloomfield is a man of great exactness of observation, soundness of judgment, and the strictest integrity. Every confidence may be placed in his statements, and his opinions are not to be lightly esteemed. Among the notes of information he gave me, made at Wareham, I find the following:—"Medium sized stock to be preferred as yielding more beef, mutton, wool, milk, &c., than either large or small stock, under similar and ordinary circumstances." Again:—"Mr. Bloomfield's dairy of 20 cows produced an average of four pounds of butter for each cow per week during the whole year. Strict accounts were kept during several years, and the result was nearly the same in each year." Now although 4 pounds a week may not at first sight appear to be a large yield, I should like any one to try if they can find a regular farmer's dairy of an equal number of cows yielding as much.

Mr. B. frequently challenged gentlemen attending the sheep-shearings at Holkham to match it with any other breed than Devons, but he never met. It may be well to state distinctly that the average of 4 lbs. per cow was the net produce from all the 20 cows, in profit, or out of profit, after suckling their calves for a few days, and supplying the family with cream.

Another note:—Mr. Bloomfield's butter is of the very best quality; this is attributable to a variety of causes. The cattle are of a very good breed,—Devons,—and are well taken care of, being in remarkably fine condition. I never before saw a dairy of cows in such order. Great care is taken in the management, as to milking, &c., of the cows, and the method of making the butter contributes not a little to render it good."

Yet another note:—"Sept. 1834. Mr. Hancock, a London butcher, was brought by Mr. Coke to see Mr. Bloomfield's Devons. Hancock expressed himself highly delighted with the dairy and stock. Speaking generally of Devons, he said, there are no cattle yield such good beef, except a very few of the very best Scots. He also said he took ten shillings worth more of fat out of Devons than out of any other sort (same sized animals). Again, he said the surloin of a Devon was longer by 5 inches, than of any other breeds, (same size,) and that he could cut three surloin pieces out of a Devon, when he could only cut two from any other sort. And further, he said, there is this difference between Devons and Scots: the former have less offal beef and more roasting meat than the latter, or than any breed that he has tried. He always prefers buying Devons when he can procure them. This Mr. Hancock is the butcher who was heard to say in London by a butcher of Wells, Norfolk, that the two very best bullocks he ever hung up in his shop were of Mr. Bloomfield's feeding."

Now, sir, if you deem the above of any value, you are at liberty to make what use you please of it. I should prefer your incorporating any portion of it in your proposed remarks on cattle; but if you think fit to publish it as a communication, I have no objection.

Hoping you may succeed in calling attention to the beautiful Devons, I remain, &c. P. H.

MISS RAPP'S SILK GOODS,—CURING COCOONS, &c.

From the Journal of the American Silk Society.

The editor of this Journal having solicited of Miss Rapp, of Economy, Pa. the privilege of exhibiting some specimens of her silk manufactures, he received from her a case containing the following articles, viz: 33 yards black figured dress silk, 12 do. lavender figured dress silk, 1½ yards green velvet, 1½ do. black velvet, 3 yards black plain satin, 12 yards figured satin vestings, 13 pieces fancy ribands, (165 yards,) 4 pieces of plain ribands, and a raw silk handkerchief. These goods are all of first rate quality—heavy and durable. They were exhibited at the public meeting of the American Silk Society on the evening of the 20th February, and elicited expressions of surprise and astonishment at the progress already made in the production of silk in this country. They furnished conclusive evidence of the important fact, that we can not only furnish all the raw material, but even the best manufactured silks from our own resources, and that all that is wanting to accomplish the great object is the diffusion of knowledge among the people, and for the people to say that they will do it.

The following are extracts from the letter of Miss Rapp, that accompanied the silks. We publish them without her permission, because it will do the public more good than it can do her harm. We would recommend attention to the extract on curing cocoons with camphor. This is an important and interesting item of information.

Economy, Pa. February 7, 1840.

GIDEON B. SMITH, Esq.—There is so great a demand for our silks that, after supplying the wants of our society, we can never manufacture as much as our store could sell at the annexed prices. There is, therefore, no necessity to seek a distant market. Notwithstanding this, we thought we would send you all we had ready made; as these specimens (together with those you will probably receive from other quarters) may assist you and your society a good deal, to convince every patriot, that our own and our own people's hands themselves can produce and manufacture this so highly beloved article of luxury, with which we are so fond to adorn ourselves, and clad in a garment of which, if thus obtained, we may justly feel a noble pride,—but, if the product of foreign hands, we have the best reason in the world to feel great shame, when we reflect, that by the way of obtaining it, we have so much and so unpatriotically contributed to squander our national treasure, burden our country with an enormous debt, and thereby lay the sure foundation of ruin and misery. These specimens have all been made of silk raised within our society in the summer of 1839. (we never wove a thread of purchased silk.) In

strength and durability they will surpass any imported article. The handkerchief of silk floss, or tow, you will please to accept as a small contribution to your collection of specimens, it is to show that that part of the cocoon is valuable too.

As you wish me to make any communication which I consider useful, I will make a few remarks:

1. On the curing of cocoons. 2. On the mulberry tree, the foundation of the whole business.

1. Since we are killing our cocoons with camphor, we find them as easy to reel, at any time after the regular season, as when freshly taken from the spinning shelves. We do it as follows: for 100 lbs. of cocoons in the floss, we take a well made box, large enough to hold them, then we take about 3 oz. of camphor, which we moisten with as much alcohol as is necessary to rub it into a powder, a part of which we sprinkle on the bottom of the box, then we fill the box by making 5 or 6 layers of the cocoons, and spread a proportional part of the camphor between each of them; then we screw on the lid and paste strips of paper on all the splits and joints, to make it air-tight. After 3 or 4 days we take them out and dry them in the shade until perfectly light. They must be assorted before camphoring, or else the bad cocoons will spoil the good ones.

2. In regard to the mulberry I would earnestly recommend, especially to the silk growers of the northern and middle states, not to neglect the cultivation of the white Italian or a similar mulberry tree, as by raising the multicaulis only the best crops (which are produced in the fore part of the summer) are lost. The multicaulis is a most excellent addition to, but not a perfect substitute for, the other kinds. They ought to go together. Several years ago we received among others a kind of mulberry under the double name of *morus brussa* or *expansa*, which we now endeavor to multiply (by grafting) as fast as possible, as it possesses all the excellent qualities of the Italian, besides having large, heavy, glossy leaves, which are gathered with less than half the labor required for the foliage of the white Italian. Such silk growers as possess this kind, would undoubtedly do well to propagate it as fast as possible along with the multicaulis. Respectfully yours,

GERTRUD RAPP, for GEORGE RAPP.

ACCOUNT OF AN AGRICULTURAL EXCURSION INTO ST. JOHN'S, BERKLEY. BY THE EDITOR.

[Concluded from page 178.]

From the Southern Cabinet.

Sweet potatoes are here, as in all the lower part of the state, grown in considerable quantities; every planter endeavoring to raise as many as will serve the plantation from the middle of August to March, when they are not longer deemed wholesome or nutritious enough for laborers. It is a matter of regret, that more attention is not paid throughout the state to this crop, which is destined, at some future day, to be of the greatest value to us, not only as food for our negroes, but also for our horses, cattle and hogs. This root far surpasses in nutritious qualities, the far-famed turnip, which is

considered so immensely beneficial to England, and which has almost regenerated her agriculture. Nor will it yield the palm to the mangel wurtzel or the sugar beet, which the feeders of stock are at present extolling so highly, the latter almost extravagantly. These may in the northern and western states, be the best roots which can be grown for stock, but in the lower parts of this state at least, (and in all probability all farther south) none of the varieties of the beet can be advantageously grown, as they invariably rot, if sown at the usual time, and if sown in summer, it is a very difficult matter to get a stand, owing to the depredations of the cut worm, heavy rains and hot suns, and if these be got over, the product is found to be comparatively small.

But we need not seek abroad for means of supporting our stock. The potato possesses all the qualities requisite, in an eminent degree, and if we will bestow on it but one half of the attention required to produce even a tolerable crop of beets, we will be repaid by a much larger and more valuable one of potatoes; but as long as it is planted on poor ground, without manure, and receives but 1 or 2 workings, as is the case in many parts of this state, we have no reason to expect any other than a scanty return. Manure and prepare the ground well, give the crop as many workings as are necessary to destroy the grass and keep the soil open, and the increased product will astonish any one who has not made trial of this course. We intend not to discuss the merits of this crop here; we may perhaps refer to it again, though we would be much better pleased, to see the subject taken up by some of our readers.

The ground selected for potatoes, usually lies contiguous to the negroes' quarters, and its nearness is more regarded than its particular adaptation to this crop, for as the allowances given out during summer are daily, (owing to the liability of this root to rot, and the product being increased by their remaining in the ground,) the hands are not compelled to go far for their food, when their work is finished. So great a weight has this had with some, that they have preferred planting particular spots, which yielded but comparatively small returns, to cultivating them on more distant fields, where the product would be greater. It was hoped that by manuring liberally, a change of fields would be rendered unnecessary; but experience has proved that this crop, at least, cannot be cultivated in the same fields continuously, for any length of time, no matter what quantity of manure may be applied. Perhaps when our scientific acquirements shall be greater, we may be able to discover what particular substance has been exhausted, restore it to the soil, and neutralise the excrementitious matter, which, according to Macaire is deposited and proves injurious to plants of the same species. At present, we must rest satisfied with the fact, and act accordingly. Two instances of this exhaustion were mentioned to us, and we understood that others had occurred. In one instance, roots were planted in a field for 13 years, when it was entirely exhausted, although the last year it was manured at the rate of from 7 to 800 bushels of compost manure per acre. In the other instance, slips (vines taken from the roots) were cultivated in conjunction with oats, for 10 years, when this field also failed to yield a crop. The plan of treatment was the same as that we

shall presently detail when giving the culture of this crop.

All of the varieties of the potato are cultivated in this parish, but the yams are the favorites in middle St. John's, while the leather coats have the preference in the upper part of the parish. The red potatoes, (red skins with white flesh) are cultivated in small quantities, being considered excellent in bowel complaints, especially among children. The adaptation of the different varieties to different soils is but little attended to, by any of our planters. We cannot but think they pay less attention to this than it deserves, for every planter must have observed, that all do not grow equally well on his plantation, that there is sometimes a difference even in fields not far distant from each other, and that his neighbor succeeds in raising those best in which he fails. This may be illustrated, in some measure, by experiments made in this parish, a few years since. On a piece of ground, manured and cultivated alike, Mr. Isaac Porcher obtained from a row, 150 feet long, of brimstone potatoes, (red skins with yellow flesh) four and a half bushels, whilst from an adjoining row, planted with yams, he obtained but two and a half bushels.

Dr. Ravenel planted several rows, dropping the yam and the Spanish pumpkin alternately on the same rows. One row, of one hundred and fifty feet in length, produced two and three quarters of a bushel of yams, and but two bushels of Spanish pumpkin. Another row yielded two and one-eighth of a bushel of yams, and only one and three-fourths of Spanish pumpkin. It will be observed that the yam, in Mr. Porcher's experiment, produced but 2½ bushels to the row of 150 feet, whilst on Dr. Ravenel's plantation, from half of that space, he produced 2½ and 2½ bushels, equal to 5½ and 4½ bushels per row, making a difference in favor of the latter of 225 and 131 bushels per acre. In another instance Dr. Ravenel obtained at the rate of seven bushels per row, or 525 bushel per acre, and this from a considerable space of ground.

On the seaboard, roots are planted only in quantities sufficient to furnish vines for planting, and for allowances until November, the "slips," (those produced from the vines,) being the principal crop, on account of their keeping better through the winter, and producing nearly, if not quite so abundantly as the others. In St. John's, on the contrary, the root crop is the principal one, and as much ground is planted with it as is supposed necessary to furnish the plantation from the middle of August until 1st January, from which time the slips are made use of, and these generally last until March, and sometimes April, though they are not given to the negroes after they become watery.

In preparing the ground, the manure is first spread, and then listed on. Compost and cotton seed are those most used. Some few still follow the old plan of "cowpenning," but the first mode is now generally adopted. The compost manure is applied in quantities of from 8 to 10 ox cart loads. The cotton seed at the rate of from ½ to ¾ bushel per row. The beds are what may be termed small for potatoes, being but about 30 to 36 inches base, and from 12 to 16 inches high, and brought nearly to a sharp ridge. By most planters, the beds are made at one operation. Major Porcher's plan is somewhat different,—a list is first made, and on it

a very small bed, which is gone over and slightly increased in size. This gone over again, and the bed made of the full size intended. By pursuing this mode, the grass seeds are more effectually buried, and the crop does not require, and actually receives, but one working. The beds are usually four feet apart, which is considered preferable to five feet, the distance allowed in some neighborhoods. The potatoes are planted throughout the month of March, and even in the early part of April, according to the season, and state of forwardness of the other crops.

By a large number, the potatoes are planted whole, as it is thought that vines may be obtained from them earlier. Others cut them, as there is a considerable saving of seed by so doing. No difference in the product of the cut and uncut has been observed. We rather think, however, that when an accurate experiment shall be made, a difference will be found. If cut, the sets are placed about 8 inches apart on the bed—if uncut, about 12 inches. Should the potatoes come up irregularly, Dr. Ravenel prefers supplying the vacancy with sprouts taken from the sets which have sent up a number.

By some only one working is given, and the grass afterwards picked out. Others give two. In each, the bed is hoed down, and immediately hauled up. Some, however, do not haul up for several days, that the grass may be effectually killed. Sometimes the plough is used to break up the alley, and which furnishes earth to enlarge the bed.

As soon as they will yield a bushel to the row, (which commonly is about the middle of August) they are dug for allowances for the negroes, which, at this time, is given only in small quantities, for the reasons already stated. They are never harvested, but left in the field until they are consumed, or destroyed by frost. The great difficulty of preserving them, and the almost certainty of losing a large portion, is the cause of their not being dug and put away, as are the slips. We have however seen them, on other plantations, kept until January, (how much later we know not) in potato cellars, in which a fire was regularly kindled every day. This served to dry the moisture which, in the form of steam, emanated from them, and to which, principally, is ascribed the injury they sustain. They keep very well when left in the beds in which they grow but care must be taken to go over and cover the tops of the beds with a little earth, or those near the surface will get frost bitten, and of course rot. From 100 to 150 bushels is the usual average crop from unmanured land per acre,—from 3 to 500 from manured. The ground intended for slips, is commonly sown down with oats, which are highly manured with either compost or cotton seed—the latter in the quantities of from 12 to 16 quarts to the row of 150 feet. When compost is used, Dr. Ravenel trenches the ground deep, sows the oats, and fills the trench with the manure and a little earth, burying them about 9 inches deep, through which they shoot and grow freely, and suffer less from drought than when sown above the manure. This deep planting is not, however, generally followed. From oats cultivated in this manner, he obtains an average of 30 bushels per acre. When the oats are harvested, the ground is lifted and bedded, as for roots, (but no manure is applied,) and as soon as the

vines have grown long enough, and there is rain, the crop of slips is planted, using three vines, placed along the bed and banked at short intervals.

It is usual to hoe them twice, when the vines will have covered the beds, and render all further working unnecessary. Early in November, if the weather be very cool and frosts threaten, they are dug and put away, either in cellars, made with pine puncheons, (such as are common all over the country) or in hills, covered with corn stalks, pine straw and earth. The latter at first only in small quantities, which is increased gradually as cold weather sets in.

We have thus given a hasty sketch of the management of the three principal crops grown in Middle and Upper St. John's. Their rural and domestic economy, as well as their management of negroes, and various other topics, connected with the business of a plantation, we will at present refrain from noticing, as it is probable we may pass through the parish on some of our proposed excursions, and we will be enabled to gain further information, and furnish a more interesting report than we can now possibly give.

COUGHT RICH OR POOR LAND TO HAVE THE GREATER NUMBER OF STALKS OF CORN LEFT TO GROW?

Our practical readers will "stare a little" at the above question being even stated. Certainly we thought we were sufficiently informed and experienced on this particular point in cultivating corn, and it never had entered our imagination that there could be even a doubt on the subject, much less that any one could advocate that corn should be planted thicker on poor land than on rich. But we now learn that the universal rule for Virginia and the south is not universal in Massachusetts; and that not only is there a question on this point, but that our brother editor of the 'Boston Cultivator' (and who is a practical and experienced cultivator himself) is as much surprised at the one side of this question being maintained, as we were at his support of the other. The following extract is from his report of one of the "Farmers' Meetings," which are regularly held in Boston, for discussion, and the diffusion of information.

"At our meeting on the 28th February, we reported Mr. C. as accounting for the thick planting of Mr. E. H. Derby's corn on the principle that the richer the land is, the nearer the stalks may stand to each other! On all other points, we coincided with Mr. C., and highly approved of his modes of cultivation in general. But we did stare a little at this new rule of placing stalks on rich land—that is, large stalks—nearer together than we would place small ones."

We do not think it necessary to discuss this question, and merely lay it before our southern readers for its novelty and singularity.

**MRS. ANDERSON'S PRESENT OF SILK CLOTH,
AND GENERAL WASHINGTON'S LETTER OF
THANKS.**

The original of the following letter was long preserved and highly valued in the family of the lady to whom it was addressed; but when an attempt was made to obtain a copy of it for our publication, neither original nor copy could be found in Gloucester county. Recently, we understood that such a letter, in the hand-writing of General Washington, was in the museum of the medical department of the University of Pennsylvania; and, at our request, a copy of it was written and sent to us, by P. Hulme, esq. of Philadelphia. It is doubtless a duplicate of the letter of which we had been before in pursuit, and kept by the writer, as was his general usage.

We had before heard, from the tradition in the family, what seems to be confirmed by the words of this letter, that Mrs. Anderson's pattern of silk of her own production and manufacture was the first gift that President Washington had permitted himself to receive; and by thus making it an exception to his general and most praiseworthy rule, that the value of his complimentary acceptance was greatly enhanced. Presidents of latter days have no such strait-laced notions in regard to accepting presents.

The autograph letter from which the following copy was made, as appears from its endorsement, was presented, in 1830, by John Augustine Washington, of Mount Vernon, to Dr. W. E. Horner. —ED. F. R.

TO MRS. ANDERSON,
OF GLOUCESTER COUNTY, VIRGINIA.

Philadelphia, July 20th, 1794.

Madam,

Not before the 8th instant had I the honor to receive your favor of the 17th of May, accompanied with a piece of silk of your own manufacture.

Contrary as it is to an established maxim of mine, not to accept a present from any one, yet, considering this as a mark of your peculiar attention to me, and as a striking evidence of what our climate, aided by industry, is capable of yielding, I receive, and thank you for this effort of your skill.

I shall have it made up, and will wear it as a memento of your politeness: having the honor to be your most obedient and obliged humble servant,
G. WASHINGTON.

SOIL AND CLIMATE OF FRANCE.

From the Edinburgh Encyclopedia.

The soil of France varies much in different parts of the kingdom; but it may be remarked, that there is scarcely any kind of soil in it, which in

England could be called a clay soil. The soils may be classed as follows:

I. Fat loam, of different degrees of tenacity. The northern district of this soil extends over the provinces of Flanders, Artois, Picardy, Normandy, and the Isle of France. On the coast, it may be said to extend from Dunkirk to Carentum in Normandy. From thence to Countances, the land is chiefly poor and stony, and continues so, though with some variations, to Brest. In a line a little to the south of the coast before Caen, the first considerable change of soil from Calais is seen. In Normandy, on the side of Alençon, rich loams on a calcareous bottom are met with. From Dunkirk to Nemours is less than 180 miles in a right line; from Soissons to Carentum is another right line of about 200 miles; from Eu, on the coast of Normandy, to Chartres, is 100 miles. The breadth of this rich district in some places, especially about Caen, &c. is not considerable, yet the whole will be found to contain not a trifling proportion of the kingdom. The fertile plains of Flanders and of Artois, are perhaps the richest parts of this valuable soil, which here consists of deep friable mould, rather inclining to clay than sand, on a calcareous bottom, bearing evident marks of having once been covered by the sea. From Paris to near Cambrai, by the road of Soissons, this loam is more sandy, but equally valuable and fertile. About Meaux, there is as fine soil as can possibly exist. It consists of an almost impalpable powder, and of admirable texture and friability. In some places it is 18 feet deep, resting on a stratum of white marl. The line from Paris through Picardy is inferior; but all the arable part of Normandy, which lies within the limits above described, is a rich, friable, sandy loam, in some places of a reddish color, and very deep. The calcareous loams are of much greater extent than the loams which have been described. To the east, they stretch across Champagne. From Metz to Nancy, all is calcareous, but not chalk. In the southern parts of Alsace, limestone land abounds. Immense districts of Dauphiny and Provence consist of the same kind of soil. Indeed, the chalk district extends east to about St. Menes, and south to Nemours and Montargis, or even farther, for it reaches Auxerre in another direction. There is also much calcareous loam in Angoumois, Poitou, and through Touraine to the Loire. Most of the course of this river is calcareous. The chalk district, therefore, may be regarded as stretching not less than 200 miles east and west, and about as much, but more irregularly, north and south. The next considerable district of fertile soil is the plain of the Garonne. Through all this plain, wherever the soil is found excellent, it consists usually of a deep, mellow, friable, sandy loam, sufficiently moist, and in many places calcareous. The plain of the Garonne is entered about Creissensac, in passing to the south from the Limosin. Its fertility increases all the way to Toulouse, where it is uncommonly rich. Its richness, however, diminishes as we approach the Pyrenees. The breadth of this plain is every where inconsiderable. Another tract of rich soil is found in the vale, which stretches from Narbonne to Beziers, Montpellier, and Nîmes; but its fertility is inferior to those that have been previously described. The soil of the Lower Poitou resembles that of the richest parts

of the Lincolnshire fens, and is indeed of the same nature, being for the most part marshy land drained, or gained from the sea. To the south of the Loire, in the direction of Bourgneuf, there is a tract of rich loam. Alsace, in respect to soil, resembles Flanders, but it is inferior to it. The whole fertile part of the narrow plain of Alsace, hardly presents a surface of more than 1000 square miles. The flat, and chiefly calcareous vale of Auvergne, which commences at Riom, is a tract of great fertility. The whole surface is a real marl, but mixed with such a proportion of soil as to be most valuable and productive. The French naturalists who have examined it, assert the depth to be 20 feet of beds of earth, formed of the ruins of what they style the primitive and volcanized mountains. The best part of this vale reaches no farther than from Riom to Vaires, scarcely more than 20 miles. Mr. Young calculates, that the whole of the fertile districts of France, which we have just described amounts to about 28 millions of English acres.

II. The district of heath is chiefly in the provinces of Brittany, Anjou, parts of Normandy, and Guienne, and Gascony. The five departments into which Brittany is divided, are reckoned to contain 1609 French square miles; the cultivated land amounts, according to some calculations, to less than one-third, and the heaths to 3,006,000 acres; according to other calculations, two-fifths of the whole province are uncultivated; and some authors assert, that of 39 parts 24 are *landes*, which amounts to three-fifths. Some of the heaths are so extensive, that a house is scarcely seen in ten leagues. The soil of the best part of the heaths in Brittany is commonly gravel, or gravelly sand on a gravelly bottom, of a very inferior and barren nature. In many places it rests on sandstone rock: none of it is calcareous. Anjou and Maine are equally noted for the immensity of their heaths, which are reported to extend 60 leagues in one place. The soil of these heaths is, however, in some parts tolerably good, and might be rendered useful by proper skill and labor; consisting of gravel, sand, or stone, generally a loamy sand or gravel. The *Landes*, as they are emphatically called, lie west from Bazadois and Condomois to the sea coast, between the country of Labour on the south, Guienne on the north, and the ocean on the west. They are divided into the greater *Landes* between Bourdeaux and Bayonne, and the lesser between Bazas and Montmarsan. They are sandy tracts, covered with pine trees, cut regularly for resin, broken and enlivened however with cultivated spots for a league or two. When the Moors were expelled from Spain, they applied to the court of France to be allowed to settle on, and cultivate these lands; but permission was not granted them. They are said to contain not less than 300 square leagues, or 1,468,181 English acres, occupying a large portion of Gascony. Though the soil of these *Landes* is among the poorest in France, it is not utterly incapable of cultivation, and even the pines with which it is covered yield from 15s. to 20s. an acre.

III. The district of chalk, as distinguished from the calcareous loams already noticed, is chiefly in the provinces of Champagne, Sologne, Touraine, Poitou, Saintonge, and Angoumois. The chalk provinces contain 16 millions of acres. The soil of Champagne in general is thin and poor. The

southern part, as from Chalons to Troyes, has from its poverty acquired the name of *pouilleux*, or lousy. Sologne is one of the poorest and most unimproved provinces in the kingdom. It is a flat, consisting of a poor sand, or gravel, lying every where on a bottom of clay or marl, so very retentive of water, that every ditch and hole is full of it, except in the driest seasons. Touraine is better. It contains some considerable districts, especially on the south of the Loire, in which good mixed sandy and gravelly loams rest on a calcareous bottom. Considerable tracts in the northern parts of the province, however, are of a very inferior soil, not better than the predominating soil of Anjou and Maine. Poitou consists of two divisions, the upper and the lower, the latter of which has already been mentioned as resembling the fens of Lincolnshire. The upper division is generally a thin loam, on an imperfect quarry bottom,—a very inferior *stone brash*. A great part of Angoumois is a thin and poor chalk.

IV. The district of gravel is chiefly in the Bourbonnois and Nivernois. The gravel in the latter is of little value, three-fourths of the province being covered with heath, broom, or wood; but, notwithstanding the inferiority of the soil, these provinces are reckoned by Mr. Young among the most improveable in France. They form one vast plain, through which the Loire and Allier pass. The better parts of them consist of a sandy soil, and in some places the subsoil is calcareous. In a few spots, good friable sandy loams are met with.

V. The district of stony soils is chiefly in Lorraine, Burgundy, Franche Comté, &c. In Lorraine, there are commons of immense extent, which scarcely yield any thing. From St. Menehould to the borders of Alsace, the soil is entirely stony, but of various kinds. Most of them are of the kind denominated *stone-brash* in England, "or the broken triturated surface of imperfect quarries, mixed by time, frost, and cultivation, with some loam and vegetable mould;" much is calcareous. Districts of rich and even deep friable loams occur in Lorraine, but they are of inconsiderable extent. The soil of Burgundy varies much. The best part of it lies in the line from Franche Comté to the Bourbonnois by Dijon. Here sandy and gravelly loams predominate; but even in this part of it there are spots of poor granite soil. The subdivision of the province called Bresse, is a most miserable country. The grounds alone on a white clay or marl, amounting, it is said, to nearly 250,000 acres. The stony soil of Franche Comté is in general good. From Besançon to Orecamp, the country is rocky quite to the surface. The rocks are calcareous. A reddish brown loam rests on the rock. In the hilly parts, a red ferruginous loam, schistus, and gravel, predominate. Part of Alsace consists of soil of nearly the same character.

VI. The district of various loams, mixed with sand, granite, gravel, stone, &c. is chiefly in the Limosin, La Manche, Berry, &c. The loams of the two former are friable, and sandy, some on granite, and others on a calcareous subsoil. Of the granite, there are two kinds; one hard, and full of micaceous particles, the grain coarse, with but little quartz, hardening in the air in masses, but becoming a powder when reduced to small pieces. This is very unferile, as neither wheat,

vines, or chestnuts will grow on it. The other sort is in horizontal strata, mixed with great quantities of spar. On it these plants thrive well. This kind of granite and chestnuts appear together, on entering Limosin; but on the road to Toulouse, where there is about a league of hard granite, this tree disappears. Berry has a poor soil, though not so poor as that of Sologne. In some places it is sandy or gravelly; in other places the loams are more tenacious, lying on quarries of stone or lime.

VII. The provinces of Auvergne, Dauphiny, Provence, the Lyonnais, Languedoc, and Roussillon, contain the mountainous district. The mountains that surround the vale of the Limagne of Auvergne are various. The white argillaceous stone in the hills, between Riom and Clermont, is calcareous. The volcanic mountains (as they are deemed) are more fertile than the others, except where they are composed of tufa, or cinders, which are so burnt as to be good for nothing. The calcareous and clayey mountains are good; and the basaltic, when decomposed, form excellent clay. The base is commonly granite. Many considerable mountains, in the tract from Le Puy to Montelimart, are also what are deemed volcanic, and they are also extremely fertile. Provence and Dauphiny, with the exception of a few plains and valleys, are mountainous. Of these, the former is the driest with respect to soil in the kingdom. Rock and sandy gravels abound; and the course of the Durance is so ruined by sand and shingle, that, on a moderate calculation; above 130,000 acres have been destroyed. If Dauphiny were divided into three parts, three-fourths of one part, it is calculated, would be cultivated land; more than three-fourths of another part would be mountainous and uncultivated; and half the third part mountainous and in culture. The mountainous districts of Dauphiny and Provence are generally calcareous. The whole coast of Provence is a poor stony soil, with very few exceptions. The Lyonnais is mountainous in many parts, the soil being poor, stony, and rough, with much waste land. Seven-eighths of the province of Languedoc are mountainous. The vale lands are rich. Roussillon is in general calcareous. Much of it flat and very stony, as well as dry and barren.

Mr. Young observes, "that the proportion of poor land in England to the total of the kingdom, is greater than the similar proportion in France; nor have they any where such tracts of wretched blowing sand, as are to be met with in Norfolk and Suffolk. Thin heaths, moors, and wastes, not mountainous, which they term *Landes*, and which are so frequent in Brittany, Anjou, Maine, Guienne, and Gascony, are infinitely better than our northern moors; and the mountains of Scotland and Wales cannot be compared, in point of soil, with those of the Pyrenees, Auvergne, Dauphiny, Provence, and Languedoc." According to the same author, the following are the proportional areas of the several divisions of the kingdom, classed according to their respective soils:

Rich district of the north-east, containing the provinces of Flanders, Artois, Picardy, Normandy, the	<i>Acres.</i>	<i>Acres.</i>
Isle of France, &c.	18,179,690	
Plain of the Garonne	7,654,564	
Plain of Alsace	637,880	
Lower Poitou, &c.	1,913,641	
Rich loam —————	28,385,675	

	<i>Acres.</i>	<i>Acres.</i>
The heath district of Brittany, Anjou, and parts of Normandy, &c.	15,307,126	
The heath district of Guienne and Gascony	10,206,065	
Heath —————		25,513,213
The mountainous district of Auvergne, Dauphiny, Provence, Languedoc, &c.		28,707,037
The chalky district of Champagne, Sologne, Touraine, Poitou, Saintonge, Angoumois, &c.		16,581,889
The district of gravel of the Bourbonnois and Nivernois		3,827,282
The district of stony soils in Lorraine, Burgundy, Franche Compté, &c.		20,412,171
The district of various loams in the Limosin, Berry, La Manche, &c.		8,292,444

Total 131,722,711

It is to be remarked, however, that this admeasurement includes the whole surface of the kingdom; deductions ought therefore to be made for roads and rivers, &c. According to M. Neckar, there are 9000 leagues of roads in France. On the supposition that their average breadth is 10 toises, this will give for the whole area occupied by roads, about 193,207 acres. A much larger space must be allowed for rivers; so that probably the number of acres may be estimated at 131,000,000, the proportional areas of the different divisions of soil remaining the same.

The climate of so extensive a kingdom as France must be very various; but perhaps, on the whole, it is more favorable to the sustenance and comfort of human life, than any other in Europe. The climate of the northern districts is hotter, and at the same time more moist in summer, than the counties in the south-west of England. In the department of Finisterre, the sky is obscured by an almost continual mist. In Brest and Morlaix, it rains almost incessantly; and the natives are said to be so habituated to dampness and wet, that too dry seasons prove prejudicial to their health. The heat in summer is never excessive, and the cold likewise is between six and seven degrees less than in Paris. The beautiful verdure of the rich pastures in Normandy sufficiently proves the humidity of the climate of this province; but, even at a distance from the coast, the rains in the north of France are extremely heavy, and continue longer than they generally do in England. In the winter, heavy snows and severe frosts are experienced to a greater degree than in the south of England; and it is remarked there, whenever there is a long and sharp frost in the north of Europe, it is felt much more severely in Paris than in London.

The central division of France possesses a wonderfully fine climate, especially the provinces of Touraine and the Limosin. In many years there is no snow, and frosts are not frequent. There are no fogs and vapors, as in Bretagne, nor the great humidity of Normandy; and yet they are equally free from the burning sun of the southern provinces. The air is light, pure, and elastic. The spring is a continuance of such weather as is seen in England about the middle of May. The harvest begins about the latter end of June, but is sometimes so late as the middle of July. The great heats are from the middle of July to the middle of

August. But the climate of the central provinces is not free from its inconveniences : all the country south of the Loire is subject to violent storms of rain and hail, the latter occasionally beating down and destroying all the corn and vintage on which it may fall. Frosts also sometimes happen in the spring, even so late as the end of May and beginning of June, so severe as to turn the leaves of the walnut trees quite black, and to render it necessary to cover the fig trees with straw. Autumnal frosts also not unfrequently occur earlier in the central provinces of France than they do in the south of England. On the 20th of September, 1787, Mr Young says, there happened so smart a one on the south of the Loire, between Chambort and Orleans, that the vines were hurt by it. The high country of Auvergne is bleak and cold ; and all the districts within reach of the mountains of Vosges are affected by the snow that falls upon them ; a circumstance which sometimes occurs as late as the end of June.

In the south of France, particularly in Provence, a continuance of dry and hot weather may be expected throughout the months of June, July, and August, and a part or perhaps the whole of September. The greatest heats seldom occur till the 15th of July, nor after the 15th of September.

Harvest generally begins the 24th of June, and ends the 15th of July : the middle of the vintage is about the end of September. During the continuance of the hot weather, or *les grandes chaleurs*, as they are called, scarcely any persons who can avoid it think of quitting their houses in the middle of the day. During the end of autumn and the beginning of winter, violent rains frequently fall ; but, in the intervals between the rains, October and November may be regarded as the pleasantest months in the year. In December, January, and February, the weather is generally fine : but after February, the *Vent de bise* is very frequent. This wind seems to pierce through the body, and dry up all the humors. It is a strong north or north-east wind, accompanied generally with a clear sky, but sometimes with snow. It seldom lasts for more than three days at a time. This wind blows with peculiar violence and bitterness about Avignon : the winters there are sometimes rendered by it most distressingly cold ; and the Rhone is covered with ice sufficiently strong to support loaded carts, and the olive trees sometimes perish to their roots. Some parts of the coast of Provence, as about Toulon and Hieres, are still milder than about Marseilles and Aix ; but the northern and more mountainous parts of the province often experience very severe weather in the winter, and are as cold as England, but with a much clearer and purer air.

The chief disadvantages of the climate of the south of France are, the plague of insects, and the peculiar violence of its storms, especially in the mountainous tracts. The flies are excessively troublesome in the olive districts of France ; they not only bite, sting, and hurt, but they buzz, tease, and worry. The mouth, eyes, ears, and nose are full of them ; they swarm on every thing eatable, fruit, sugar, milk, every thing is attacked by them in such myriads, that if they are not driven away incessantly by a person who has nothing else to do, to eat a meal is impossible. Sometimes it is absolutely necessary to darken the room, in order to keep it tolerably clear of them. In the stables,

they are obliged to cherish the spiders, that their webs may catch the flies, which would otherwise be an actual torment to the horses. In the night the gnats are very troublesome ; and, besides the torment of their bite, render sleep extremely difficult to be procured, by their constant and loud noise. The author of the *Essai sur la Mineralogie des Pyrenées* describes a thunder storm near Bareges as extremely impetuous and formidable ; the cataracts rushing down the sides of the mountains, carrying ruin and desolation along with them ; those meadows, which a few hours before were covered with verdure, now buried under heaps of stones, or overwhelmed by masses of liquid mud, and the sides of the mountains cut by deep ravines, where the track of the smallest rivulet was not before to be discovered. The hail storms in the south, and even in the central provinces of France, are not unfrequently most dreadful and ruinous in their consequences. About thirty years ago, a violent storm of hail swept a track of desolation in a belt across the whole kingdom, to the damage of several millions sterling ; and no year ever passes without whole parishes suffering to a very considerable degree. In the south of France, where the hail storms are the most common and the most violent, it is calculated that, on an average, one-tenth of the whole produce is damaged by them. Young colts are sometimes so severely wounded by the hail as to occasion their death ; and it has even been asserted, that men have been known to be killed by the hail, when they could not procure shelter.

The climate of France naturally divides itself into four zones, according to the vegetable produce which each affords. The most northern of these divisions bears a considerable resemblance, in its vegetable produce and in its climate, to England : the second differs from the first principally in exhibiting here and there a few vineyards ; in the third, fields of maize begin to make their appearance ; and the fourth is distinguished from the preceding by the intermixture of olives, mulberries with corn, vines, and maize. The line of separation between vines and no vines is at Coucy, ten miles to the north of Soissons ; at Clermont in the Beauvoisis ; at Beaumont in Maine ; and Herbignac, near Guerande in Brittany. The line of separation between maize and no maize is first seen on the western side of the kingdom, in going from the Angoumois and entering Poitou, at Verac, near Ruffec : in crossing Lorraine, it is met with between Nancy and Luneville. If these lines between vines and no vines, and between maize and no maize, be drawn on the map of France, it will be found, that they proceed in an oblique line from the south-west to the north-east, being parallel to each other. The line which the vines form is nearly unbroken ; but that formed by the maize in the central part of France, proceeds no farther north than the southern part of the Limosin. The line of olives is also pretty nearly from south-west to north, in the same oblique direction. In proceeding to the southward from Lyons, they are first met with at Montelimart ; and, in proceeding from Beziers to the Pyrenees, they are lost at Carcassone. Hence it appears, that there is a considerable difference between the climate of France in the eastern and western parts ; the eastern side of the kingdom indicating, by its productions, $2\frac{1}{2}$ degrees of latitude of more heat than the western.

Having made these general remarks on the climate of the different parts of France, we shall next proceed to lay before our readers an abstract of the most careful meteorological observations, as they respect the thermometer, barometer, winds and rain.

I. The annual heat of London and Paris is nearly the same; but, from the beginning of April to the end of October, the heat is greater at Paris than at London. If the annual temperature of London be represented by 1000, the average degree of cold in January by 1000, and the average degree of heat in July by 1000, the annual temperature of Paris may be represented by 1028; the average degree of cold of Paris in January by 1040; and of heat in July by 1037. The annual temperature of Bourdeaux will be represented by 1090; the average degree of cold in January by 925; and the average degree of heat in July by 1139. The annual temperature of Montpellier will be represented by 1170; the average degree of cold in January by 850; and the average degree of heat in July by 1196.

In the centre of France, the greatest heat averages 27 degrees of Reaumur's thermometer, and the greatest cold 7 degrees: in the north of France, the greatest heat is 23° 2', and the least 6° 6'; in the east of France, the greatest heat is 24° 3', the least 9° 5'; in the west of France, the greatest heat is 24°, and the least 6°. In the south-east, at Montpellier, the greatest heat is 29° 1', the least 5° 7'. At Marseilles, the meteorological observations of nine successive years gave an average of 25° 3' for the greatest heat, and 3° 1' for the least.

II. In the neighborhood of Paris, the barometer never continues twenty-four hours without changing. The barometer rises and falls sooner in the western districts than in the eastern. M. Burckhardt, after 15,000 barometrical observation in order to calculate the influence of the winds on the barometer in France, found that the south wind gave, for a mean height, 27 inches 11.3 lines, while an east wind raised the mercury to 38 inches 1.9 line. He also found, that the height of the barometer on the Mediterranean shores of France was 28 inches 2.2 lines, while its height on the Atlantic shores was 28 inches 2.8 lines.

In the centre of France, the greatest height of the mercury in the barometer, on an average of several years, is 28 inches 5.7 lines, its least height 27 inches 3.3 lines: in the north of France, the greatest height is 27 inches 10.10 lines, the least 26 inches 8.5 lines: in the west, the average height of the mercury in the barometer is 28 inches 3 lines: in the north-east, at Montpellier, the greatest height is 28 inches 5.8 lines, the least 27 inches 5.5 lines. At Marseilles, the greatest height of mercury in the barometer is 28 inches 7.2 lines, the least 27 inches 3.7 lines.

III. It appears from the result of observations made by M. Cotte, at 86 different places in France, that along the whole south coast of that kingdom, the wind blows most frequently from the north, north-west, and north-east: on the west coast, from the west, south-west, and north-west; and on the north coast, from the south-west. In the interior parts of France, the south-west wind blows most frequently in 18 places; the west wind in 14; the north in 13; the south in 6; the north-east in 4; the south-east in 2; the east and north-

west each of them, in one. About Dunkirk, according to the same author, the prevailing winds are the south-west. As, however, the result of other observations differ from those given by M. Cotte, we shall subjoin them.

According to these observations, in the centre of France, the prevailing winds are the south-west and north-east; in the northern districts the south-east wind is most common; in the eastern districts the north and south-west winds; in the west of France the north-east is the prevailing wind; in the south-east at Montpellier, the north and north-east are the prevailing winds; and at Marseilles the south-east and north-west.

IV. The mean quantity of rain that falls at Paris is 22 inches; the evaporation is generally greater than the rain; the mean evaporation being 33 inches. In the centre of France, the average quantity of rain is rather more than 20 inches; the number of rainy days in the course of the year 164. In the north of France there are 126 rainy days; in the east 145; in the west 150 rainy days; in the south-east, at Montpellier, there are 74 rainy days, and the quantity of rain is upwards of 27 inches—a proof of the violence of the rain when it does fall. At Marseilles, the quantity of rain is rather more than 21 inches, and the number of rainy days 57.

THE DRAG LOG AND COULTER PLOUGH.

From the Centreville Sentinel.

Sir:—I desire to draw the attention of your agricultural readers to two implements which I used last year in the cultivation of my corn crop; the drag log and the coulter plough. I took them from the Farmer's Register, to which I am much indebted for useful information in my agricultural pursuits. Perhaps my notions of the benefits of these implements can be best conveyed by an account of the cultivation of my crop.

I flushed the ground with Chenoweth's plough, No. 9, early in the season, to the depth of the soil, and as the ground was ploughed, followed quickly with the drag log, which pulverises and reduces it much better than the revolving roller. I then ran over it with the large spike-tooth harrow, and checkered it at the distance of four feet each way, with the coulter plough, and after planting covered with the spike-tooth harrow. When the corn rose so as to be seen distinctly, I ran the coulter plough close to the rows, and ran over it again transversely with the spike-tooth harrow. After clearing and thinning, as soon as the grass began to grow, I ran the coulter plough four times in each row, crossing with rank cultivators, and shortly before harvest gave it the same cultivation reversed. This was the entire cultivation—I never used a hoe except for clearing. My crop was much larger than any I ever made, I do not mention the quantity, as it was not put through a corn barrel, but ascertained by corn house measurement. I believe I derived much benefit from the cultivation, though I do not attribute the increased product entirely to it; my lands are under improvement, principally by marl and marsh mud. I gather but few blades and cut no tops. My corn fields were heavily set with blue grass. I never so well subdued it, and accomplished my cultivation with so much ease.

The coulter plough may be set to run from six to twelve inches deep, one good horse will carry it. The sod turned by the flushing plough, and compressed by the drag log, is cut by coulter ploughs without being turned up, it decomposes, and, I believe, affords aliment to the corn.

I had heretofore thought that the roots of corn, in their growth, were disposed to take a horizontal direction; I am now of opinion that this is mainly owing to a superficial cultivation, and where the ground is loosened below the soil, by the deep cutting of the coulter plough, they will strike downwards. One of the supposed advantages of the hill, is to give the stalk support. My cultivation produced a flat surface, and several gentlemen who saw my fields, after the heavy rains, and winds of August, thought it less blown down than any they had seen, and one of them, who had gone from Baltimore to Wilmington, thence to Dover, and then down the country to my house, walking in my corn fields made the remark without his attention being drawn to it by any observation of mine. In the course of the fall I pulled up several stalks in different parts of my field, I found most of the roots to have struck down. They were generally from eight to ten inches long, many of them from twelve to fourteen, and I found one seventeen. These roots, instead of extending over the ground, covered a diameter of about ten inches, the stalk being the centre. Where the roots run perpendicularly it necessarily follows that the corn is less injured by the last cultivation, and though I have known persons assert that the cutting the roots of corn did it no injury, I never could come into the opinion. I corresponded with a very intelligent farmer in Virginia, about the coulter plough, who stated that corn cultivated by the coulter plough suffered less in a heavy drought than when common corn ploughs were used; for this two reasons may be assigned—the ground retains moisture longer than when turned over by consecutive ploughing, and the roots striking deeper, are less exposed to the influence of the sun. I do not say that the cultivation I have mentioned would be suitable to all soils; mine is a friable mould with a red clay bottom; perhaps it would not answer in a stiff tenacious clay.

The drag log is made of the following materials. A solid square piece of timber, six feet long by twelve inches, another piece five feet long, of sufficient strength to bear the weight of the log, to be connected by pieces eight inches long, besides what is allowed for tenons, the two long pieces to be connected by the short ones, so that the part of the log next to the ground will run even on it. Two strong oxen will carry it, and hold way with two flushing ploughs. The coulter plough I cannot describe on paper, it may be seen at Mr. R. B. Carmichael's, near Centreville, or at my house on Wye. They were made by Mr. Hambleton, at Wye Mill. I am a very inexperienced farmer; most of your readers know that my early days were devoted to a different occupation, and I should feel unwilling, from the experience of a single year, to involve any farmer in cultivation like mine. If any shall be disposed to try it, I would recommend that he should confine it to part of his crop, and they could then determine by comparison the advantages of the cultivation.

I have a strong and abiding attachment to the Eastern Shore of Maryland. I have been in

several of the Atlantic states, and I believe the natural fertility, the internal resources, and advantages of the Eastern Shore are equal to any region of the same extent in any of them. We have barren sandy districts, which ought never to have been cleared, or cultivated; they have desolate hills and mountains, in New York and Pennsylvania, which the hand of industry can never improve. I have witnessed with high gratification the progressive improvement of our agriculture; and if the enormous debt which now hangs upon us, (the handy work of internal improvers,) does not bring ruin and desolation upon the state; the day is not far distant, when the increased production of our lands will establish their real value.

W. M. CARMICHAEL.

Wye, March 20.

From the Germantown Telegraph.

ON THE SUPERIOR ADVANTAGES OF GROWING ORCHARD GRASS WITH RED CLOVER.

Read before the Philadelphia Society for promoting Agriculture, March 4, 1840, by James Mease, M. D., V. President.

My attention was first called to this subject when reading the late Mr. Bardley's 'Notes on Husbandry,' (1799,) in which he states the benefits to be derived from the sowing together the two grasses first mentioned, and his remarks appeared so well founded in reason, that I was disposed to pursue the practice he recommended; but before trying the experiment, I consulted the late Algernon Roberts, of Philadelphia county, one of our best farmers, on the subject, and was pleased to hear him approve of the measure.

My question was, "Which was the best grass to grow with red clover?" He answered at once, "Orchard grass," by reason of their blossoming at the same time, and the orchard grass giving early and late pasture, which was a great object with him, as he devoted his attention to the supply of butter for the Philadelphia Market. Joseph Cooper, of New Jersey, to whom I also applied for an opinion on the same point, was equally prompt in favor of the union of the two grasses in question. Thus backed, I had no hesitation in deviating from the usual routine adopted in Delaware, and still continued very generally throughout Pennsylvania; and upon the first field of wheat which I laid down, viz: in 1806, I had sown the following spring, 12 measured pints of clover seed with one bushel and a half of orchard grass seed previously well mixed. After the grain was removed, I saw, with very great delight, both grasses thickly covering the ground, and nearly as high as the stubble; and late in the autumn had the satisfaction to see my cows enjoying a luxurious, succulent repast, after the fields, which were sown with timothy and clover in the vicinity had ceased to supply it. But this gratification was small when compared with that I experienced the following spring, by beholding the towering orchard grass in full blossom at the same time with its companion, and the ground thickly set with both. Reserving a certain space for maturing the seed of the orchard grass, I had the crop cut when a few only of the clover blossoms were beginning to turn, being then sure of perfect maturity of the rest, and found that they, equally with the leaves, retained

their connexion with the stalk much better than when the grass was cut after the clover blossoms had assumed a dark hue. Another advantage attending this early cutting is, that the stalks preserve their pliancy and are eaten freely by cattle; whereas they are wasted when they become hard from the mowing having been done at a late period.

My experience of six years of the union of the two grasses enables me to say that the advantages of sowing orchard grass in preference to timothy, are as follows:

1. Two crops in place of one.
 2. Good pasture late in the autumn instead of none.
 3. The curing of both grasses in full perfection, while, when timothy is sown, the clover blossoms and leaves are dead, black, and chiefly fall off in the curing of the hay, owing to the ripening of the timothy from 12 to 15 days after the clover. Farmers will never cut their grass until the timothy is fit for the scythe.
 4. Early pasture, even before the pestiferous, hateful wild garlic makes its appearance, or at least as early as the latter, and by its rapid growth, smother or lessens the crop of this enemy to the products of the dairy. The same remarks apply to the autumnal growth of garlic.
- Orchard grass is upon a par with timothy, in point of nutritive quality and of animal partiality, and will command nearly as great a price as timothy. Two crops, and the early and late pasture of the orchard grass make up for the small difference in the price of hay from the two grasses.

PRESERVATION OF PUMPKINS.

From the American Farmer.

We understand that Mr. C. S. W. Dorsey is at this time feeding his milch-cows freely on pumpkins of last year's growth, which are in a state of perfect preservation. The butter is of the finest quality, and of the richest color, as might be expected, from such food. His mode of preserving so perfectly a vegetable which, while it can be kept sound, all consider so valuable, but which has generally been found to be delicate and perishable, is worthy of being noted. We understand his system to be to cover the space in his barn intended for their preservation with dry straw, say a foot or 18 inches thick. On this is placed a layer of pumpkins, and on that another thick layer of straw, and so on; and the result is that his cows have been supplied to the present time with an abundance of this superior food, in a perfectly sound and pure condition.

SUGAR BEET AND RUTA BAGA.

From the American Farmer.

Wye, Queen Anne Co. Md., }
March 26, 1840. }

In a late No. of the American Farmer, Mr. Barney's manner of storing roots for winter use, is given. I have grown ruta бага for several years, and also sugar beet for the last two, which I esteem more valuable, but intend still to plant ruta бага. As the crops are planted at different sea-

sons, success might attend one, where the other failed. From my observation the sugar beet attains maturity by the middle of September—the ruta бага continues to grow till the first becomes sharp. To preserve them through the winter, I dig a long pit sufficient to contain my crop, and build over it a frame composed of oak forks, and pine poles; the two sides are four feet perpendicular, which, with the ends and top, are thatched with corn-stalks, and the top covered thick with the dry leaves of the pine. I am careful to construct the house so as to exclude light, wind and rain. I insert a small wooden pipe through the top to carry off the exhalations from the roots; and the door, which is also made to fit close, is never opened, except to get out the roots. I have used the last of my roots, within a few days. My crop of both was twenty tons, and a trusty servant, who has had the charge of them, tells me there is not more than two bushels damaged in the whole lot.

I pulled my roots about the last of October, and after separating the tops, left them to dry, and then stored them in bulk. The ruta бага is a hardy plant, and might safely have been left out longer. Some of my neighbors tell me that their sugar beets were much damaged by the early frosts of November.

I do not intend to put my plan in competition with Mr. Barney's—in a grazing country, perhaps his is the best, but in ours, where the principal benefits derived from cattle are butter, milk and beef for domestic use, and oxen for burden, it is an object to save labor and cost. If a Pennsylvania Farmer who expends as much in building his barn as his dwelling, reads this communication, he will perhaps say the contrivance is worthy of the country from which it comes.

WM. CARMICHAEL.

BEAN PODS POISONOUS TO SWINE.

From the New England Farmer.

Mr. Breck—Some years ago, I had thrown into my hog pen, where there were six shoats, some Saba, commonly called Civy, bean pods. When I came from my work at noon, I found them all sick, vomiting and in very great distress. Not knowing then that the bean pods had been given to them. I went to dosing them with such things as I supposed might be good, but, in spite of all my efforts, in about one hour after my first discovery of their being ailing, five of them were dead. I opened and examined one of them, and found that all of a liquid kind was thrown up, and the potatoes with which they were fed in the morning, together with whey, were in a hard lump, and the bean pods mixed in with them.

Some suppose that it is the spur on the end of that kind of bean pod which does the mischief. I am of a different opinion, because those spurs, when green, are too soft to have any bad effect. I believe them to be poisonous; my hogs were evidently poisoned. Every man, who keeps hogs, and raises civy beans, ought to know that it is dangerous to give these pods to hogs, and that it may be more generally known, is the reason of this communication.

LEVETT PETERS.

Westborough, March 3, 1840.

MANURE, AND THE ILL EFFECTS OF DIRTY STABLES.

From the Farmers' Cabinet.

The following judicious remarks on the preservation of the urine of animals, have been extracted from Hayward's Agriculture, and may be acceptable and useful to the readers of the Cabinet.

"The superior effect of putting the manure on the land as it is produced, as stated by Sir H. Davy to be the case with Mr. Coke, may be accounted for as arising from the urine absorbed by the litter which, if left in the usual way, spread in an open yard, would have been wasted and lost."

To show the fertilizing effects of urine, Sir John Sinclair says, "every sort of urine contains the essential elements of vegetables in a state of solution. The urine of a horse, being so much lighter, would be more valuable than its dung, if both must be conveyed to any distance. The urine of six cows or horses will enrich a quantity of earth sufficient to top-dress one acre of grass land; and as it would require four pounds worth of dung to perform the same operation, the urine of a cow or horse is worth about twelve shillings (\$3) per annum, allowing eight shillings per acre as the expense of preparing the compost. The advantages of irrigating grass lands with cow urine, almost exceed belief. Mr. Harley, of Glasgow, (who keeps a large dairy in that town,) by using cow urine, cuts some small fields of grass six times; and the average of each cutting is fifteen inches in length."

In a note to the above, the author observes, that "whilst recommending the careful and effectual draining of stables, for the preservation of the urine, as the most valuable part of animal manure, I will also state a circumstance which cannot be thought unworthy of notice to agriculturists, which occurred to me, to show how necessary this is also to the health of animals.

"I took possession of some stables, with the horses that had been some time kept in them, and, to my misfortune, in a very short time I found that horses kept in those stables had been subject to the dreadful disease called the mad staggers for several years. Some horses had died, and the horses then there, and which had been for some time kept in the stables, were in wretched condition. Two fine fresh horses which were put into them were within a few months seized with the mad staggers, and one of them literally killed himself by knocking his head about against the manger and stall; the other was saved by copious bleeding and removed into a fresh stable, but was so reduced as to be lessened in value one-half. My neighbors advised the pulling down the stables, considering the disease infectious; but having, on going into the stables early in the morning, been almost suffocated and blinded by obnoxious gas, I examined the floor and drains, when I found the former to consist of large burr stones, laid on a stiff clay; and the floor sunk so low below the drain, as not to admit of the draining away of the urine. This struck me to be a sufficient cause to affect the brain of any animal confined in it, the same as it had the horses. I therefore had the floor taken up, relaid, and properly drained; and the walls and ceiling, manger, cribs, &c. washed with quick lime; and from that time for ten years, I never had a diseased horse."

The mad staggers is undoubtedly a violent in-

flammation of the brain of the horse, produced, in all probability, by inhaling noxious, acrid gases, such as are the product of foul stables; for we never see cases of this disease among horses that breathe a pure, uncontaminated atmosphere. Horses which are kept in confined stables in cities, where the manure and urine are deposited in cellars underneath them, are most subject to this disease. The remedy, or rather the mode of preventing the disease, is so obvious, that every person who has charge of so valuable an animal as the horse, should be apprised of the importance of keeping a clean stable, so as to insure a pure atmosphere, that the lungs or brain may not suffer injury by inhaling ammoniacal gas or spirit of hartshorn, which tends to produce irritation and inflammation of the fine, tender membranes, which line the nasal processes and the lungs of all animals.

The disease called hollow horn in cattle, is inflammation of the interior of the head and horns, which communicate with the nasal processes, and very probably proceeds from the same cause which produces mad staggers and glanders in horses; to wit, foul acrid gases, inhaled in sufficient quantities, and for a time sufficient to irritate the very delicate membranous structure of the interior of the head, so as to excite inflammation, and finally suppuration, mortification and death. This is rendered the more probable, as horses and cows when stabled are generally enveloped in one common atmosphere, and the disease does not often show itself till the season is considerably advanced, when the foul malaria has had a long time to operate on the tender parts to which it is constantly applied while breathing. Milk cows are generally more closely confined than bulls or young cattle, and it is believed they are much the most frequent subjects of the disease. It is hoped this subject will claim the careful examination of all intelligent farmers, and it is desired that their observations may be recorded and published, whether they go to sustain the above theory or to destroy it. Of one thing we are all certain, that to breathe pure, uncontaminated air is more conducive to health, than to inhale that which is foul and irritating to the lungs. An occasional smell of a hartshorn bottle may not be disagreeable or unwholesome, if it is not too concentrated; but to be enveloped in an atmosphere of it for half our time, during the winter season, which is the case with a very large proportion of our horses and cattle, cannot be expected to promote the healthy action of the system, but on the contrary to produce disease and premature death.

AGRICOLA.

EXTRACT FROM AN ADDRESS TO THE MIDDLESEX (MASS.) SOCIETY OF HUSBANDRY AND MANUFACTURES. BY REV. H. COLMAN.

From the New Genesee Farmer.

What constitutes national wealth? What are commerce and trade and manufactures all concerned with but the products of the field? A single article of the produce of southern agriculture is rated this year at 80,000,000 of dollars. But vast as this value of the cotton crop may seem, it is little compared with the value of the wheat and the corn crop, and the amount of vegetables and grasses, of dairy produce and of pork, and beef, and wool, that are required and produced for the use and trade of

the country. It is impossible to come at any exact estimate of these matters; but every individual may approach an estimate by considering what is the expense of cotton to him in the year compared with other expenses incidental to his clothing and subsistence.

We have, it is true, in modern times, invented another mode of increasing national wealth, and that is by the creation of bills of credit, bank notes, promises to pay. Many of us are simple enough to believe that we grow rich just in proportion as we multiply and can circulate these promises to pay. Now, I admit that to a certain extent and within rigid limits this may be a wholesome operation; but is it any actual increase of wealth? Does a man grow rich in proportion as he multiplies his promissory notes of hand? In private life, this would be deemed an *Irish* way of getting rich; in associations it does not differ from this. I mean where it is mere credit; not resting upon actual accumulations, nor based upon prospective results, which are as certain as any thing future in human calculations can be. But when these promises to pay are once made, who is to pay them? If they are ever paid at all, it must be by the hand of productive labor—by the products of the field or the sea. If productive labor does not make them good, they will never be good for any thing. Every bill of credit that is issued is an assessment upon the industry of the country. It would have been well for the public had they seen this before they incurred the tremendous losses which they have already suffered. It would be well if they could see it now in season to guard, as well as they may, against the tremendous explosions which must accompany the extravagance and reckless extension of a system fraught with innumerable evils to the honest industry of the country, and adapted to frame the profligate idler's palace out of the laborer's bones!

But, when will men learn any thing from experience? What we call the public is a long-eared animal. The craty understand him. They go into the pasture with their measure of oats, the same decoy which has caught many silly animals before him, and shake it before his eyes, holding the bridle behind their backs and coming up the blind side of him: before he can touch his nose to the grain he finds the bit in his mouth. Then it is all over; and he must take patiently the whip, which sometimes at every stroke brings blood, if he attempts by rearing or kicking to throw his rider.

RULES FOR OVERSEERS.

From the Carolina Planter.

Mr. Editor:—When I employ an overseer, I read to him the rules of my plantation, and give him to understand at once that he is to be governed by them. It is part of my contract. Those which relate more particularly to the overseer's duty, I send you for publication. I cannot help thinking that if such rules were generally adopted and enforced, this useful and necessary class of men would be improved. FRANKLIN.

RULES OF THE PLANTATION.

1st. A good crop means one that is good, taking

into consideration every thing—negroes, land, mules, stock, fences, ditches, farming utensils, all of which must be kept up and improved in value—the effort therefore must not be merely to make a given number of bales of cotton, but as much as can be made without interrupting the steady increase in value of the rest of the property.

2d. The overseer will never be expected to work in the field, but he must always be with the hands when not otherwise engaged in the employer's business—and will be required to attend on occasion to any pecuniary transaction connected with this plantation.

3. The overseer must never be absent a single night or an entire day without permission previously obtained. Whenever absent at church or elsewhere, he must be on the plantation by sun down without fail.

4th. He must attend every night and morning at the stable, and see that the mules are watered, cleaned and fed, and the doors locked. He must keep the stable key, at night, and all the keys in a safe place, and never allow any one to unlock a crib but himself. He must endeavor also to be with the plough hands at noon.

5th. The overseer must visit every negro house at daylight in the morning and see that all are out. Once a week or more he must visit them after horn blow at night, to see that all are in. Once a week he must visit every negro quarter after night. The horn will be blown in winter at 8, in summer at 9 o'clock, after which no negro must be seen out of his house.

6th. The overseer will be expected not to degrade himself by charging any negro with carrying news to the employer. There must be no news to carry. The employer will not encourage tale bearing, but will question every negro indiscriminately whenever he thinks proper about all matters connected with the plantation, and require him to tell the truth. When he learns any thing derogatory to the overseer he will immediately communicate it to him.

7th. The overseer must ride but one horse unless he obtains permission to do otherwise. And as the employer's business will require his whole attention he is expected to see but little company.

8th. He will be expected to obey strictly all instructions of the employer. His opinion is requested on all questions relative to plantation matters as they arise, and will be treated with respect, but when not adopted he must cheerfully and faithfully carry into effect the views of the employer, with a sincere desire to produce a successful result. He must carry on all experiments with fidelity, and note the results carefully, and he must, when instructed by the employer, give a fair trial to all new methods of culture and new implements of agriculture.

9th. The whole stock will be under the immediate charge of the overseers, and he will attend to them personally, with the assistance of any negro he may choose from time to time. He must see and feed every hog at least twice a week, and salt and count the cattle once a month. The overseer must without being asked, inform the employer of any thing going on that may concern or interest him.

10th. The negroes must be made to obey and to work, which may be done by an overseer who attends regularly to his business, with very little

whipping; much whipping indicates a bad tempered or an inattentive manager, and will not be allowed. The overseer must never, on any occasion, unless in self defence, kick a negro, or strike him with his hand, or a stick, or the but-end of his whip. No unusual punishment must be resorted to without the employer's consent.

11th. The sick must be treated with great tenderness, and visited at least three times a day, and at night if necessary. The greatest attention must be paid to all the children; and they must be kept clean, dry and warm by the nurses. Suckling and pregnant women must be indulged as much as circumstances will allow, and never worked as much as others. Sucklers must be allowed time to suckle children, and kept working as near the house as possible. No lifting, spinning [?] or ploughing must be required of pregnant women.

12th. The use of spirits is absolutely forbidden on this plantation, unless when prescribed by a physician—not even a Christmas dram is allowed the negroes. Should the overseer get drunk he must expect to be instantly discharged.

13th. The overseer is particularly enjoined to keep the negroes as much as possible out of the rain and from all kinds of exposure, and to see that they make good fires in cold weather and after rains.

14th. The overseer must not punish the driver except on some extraordinary emergency that will not allow of delay, until the employer is consulted. Of this rule, the driver is, however, to be kept in entire ignorance.

15th. It is distinctly understood in the agreement with every overseer, that whenever dissatisfied he can quit the employer's service, on giving him one month's notice in writing—and that the employer may discharge him at any time, by paying him for his services up to that period, at the same rate as he agreed to pay for the year.

ON ROOT CULTURE, AND THE DISTANCES REQUIRED BY DIFFERENT ROOTS.

To the Editor of the Farmers' Register.

March 6th, 1840.

In your February number I perceive that one of your correspondents, who says he is a cultivator in latitude 41°, has bestowed upon me a brief complimentary notice, for which I here beg leave to return him my thanks. But he has done it in a way to produce erroneous impressions in regard to the meaning of the passages to which he refers in one of my former communications, and therefore I owe it, both to your readers and myself, to endeavor to correct his mistake.

In speaking of the proper distances to sow turnips, he says: "I think two feet ridges might do, if straight." This remark he prefaces by asserting, as a thing absolutely certain, although it is very far from being so, that "narrow intervals," (by which he means any less than three feet.) "in the United States, are inadmissible." With what propriety he can apply this unqualified assertion to a country comprehending somewhere about 25 degrees of latitude, with every variety of soil and climate to be found within such limits, I will not now inquire, but will confine my remarks chiefly to my own case. Your correspondent has

misconstrued me in this respect: he says, "I think two feet ridges might do, if straight." Now this is mere matter of opinion, worth little or nothing, as such, to any body; but it is matter of experience also. For, more than once, I have actually compared two and three feet drills, not "ridges," which do not suit our climate, (about 37½ degrees,) so well as drills on a level surface, where the roots have a little earth thrown to them as soon as the leaves are nine or ten inches high. This comparison was made in similar soils, and of similar fertility, as far as I could judge; although, if there was any difference, the three-foot drills in the last trial were in the richest ground. It is true, that the comparison was not as accurate as it might have been, and as it shall be hereafter, if I live, for I did not weigh. But I could discover no difference either in the general or particular size of the roots, although I examined them very minutely; and the fact being indisputable, that the two-foot drills produced in number one-third more roots, I inferred that the whole quantity was nearly, or quite, one-third greater, and would, consequently, more than pay for the extra labor, to say nothing of the common opinion, that middle-sized roots contain more nutriment in proportion to their bulk, than those of the largest size. Much of this I admit was conjecture, and of course may be wrong; but the comparison can easily and fairly be made by any body who has curiosity enough to make it; for three or four rows at each distance will suffice. Conjectures, however, and assertion too, will be found, upon examination, to constitute a large portion of your correspondent's communication. Thus, after saying, "I have had leaves of turnips to measure three-feet frequently, before the bulk was much larger than a goose-egg," he asks this question, "If such plants were in two-feet ridges, what would become of them?" This question he answers himself by replying: "Evidently enough they would be smothered." Now I can truly affirm that I have never seen such evidence, although I also have had leaves of the ruta бага turnip to measure three-feet in two-feet drills, but not frequently; and nothing like smothering has ever occurred, for they had enough of light, air and moisture to make them grow very well. But the fact is, in regard to turnips, that the larger the leaves, the smaller will be the roots in proportion. Again, in speaking of beets, your correspondent confidently asserts, that the mangel wurzel is "far superior for cattle to all the rest." In reply to this, I must beg leave to say, that he ought not to expect such anonymous authority to stand good against the numerous names of experienced farmers which have appeared in several of our agricultural journals, who give the preference, after comparative trials, to the white sugar-beet. To these have been added several statements of chemical analyses, proving that the latter kind of beet, had considerably more of the saccharine principle than the former. Now, if that principle in vegetables be the chief source of nutriment to the animals fed on them, it incontestably follows, that your correspondent's preference for mangel wurzel for cattle is more a matter of fancy than of fact.

Towards the close of his communication, your correspondent adds: "I have a word or two more to say respecting the distance at which turnips

and beets ought to be drilled." He then asserts, that, "any thing less than three-feet will not answer, and, even at that, it is almost impossible to give them the requisite tillage, if the preparation is good." I will not affirm that mine has ever been what he would call "good." But I can truly say, that in such as it has been, I have never found any thing like an impossibility in giving them what I deemed requisite tillage with a proper coulter, a very small plough and the hand-hoe, even in two-feet drills, "if straight," as they may very easily be made by any one who chooses to take the trouble. Be it remembered, that I confine my remarks to latitude 37 or 38°. And be it also remembered, that the use of the plough in the culture of the root-crops, is every where, I believe, discontinued before the leaves of the plants nearly reach their full growth.

From the whole context of the communication which has elicited my remarks, I conclude that your correspondent thinks we should be regulated in the distances at which we drill our root crops, by the length and size of their leaves. Admit this to be true, and I would ask why he recommends the same distance for beets as for ruta бага, since the leaves of the former are little, if any, more than half the size of the latter? Surely this must be an oversight.

When I began this letter, I intended nothing more than to explain away what appeared to me a misconstruction, (although not a wilful one,) of certain remarks of mine in a former communication. But on perusing what I have written, I perceive that I have been led insensibly into several comments on your correspondent's opinions relative to the general management of root-crops, but especially of ruta бага and beets. Should these comments appear to him to be freer than the occasion called for, I assure him that they proceeded from no other motive than the one by which he himself appears to be guided—to wit, the good of our common cause. Although we differ in regard to the matters which I have specified, I agree with him perfectly as to the great importance of root-crops, and the necessity of much more attention than is usually paid to the seasons or times, together with the proper soils and preparation for sowing or drilling all the different kinds usually relied upon for stock. Permit me here to add a few words relative to the diversity of opinions and practice which prevail on these subjects. It is ascribable, in part, to the differences in soil, climate and fertility of the lands wherein our root-crops are cultivated. But chiefly to the want of curiosity, added to the obstinacy of those who undertake to prescribe in these matters, and who will insist upon the practice of their own particular locality being the best for all. A moment's reflection would prove this to be utterly absurd. But the great misfortune is, that for every one of our brethren who will take the trouble to reflect and inquire, there are probably thousands who will never be guilty of any such self-annoyance. Hence the slow progress which all must acknowledge to be made in every branch of our husbandry. Nothing illustrates this more clearly than the perpetual controversies in regard to root-crops. Yet a very few comparative trials with each particular kind, as to soil, fertility, distances and culture, would suffice, if accurately made, to enable each more certainly to determine

for himself, which was best in his own situation, instead of pursuing, as we often do, some course which, if not the worst, is very far from being the best. Without such accurate trials, disputes will and must go on the end of time; for none of us can arrive at any thing like certainty in our practice, merely by argumentations, however ingenious and protracted. These may serve to amuse and entertain, but can never afford useful instruction without minute, intelligible details of practice and its results.

In conclusion, I beg leave to present you with a brief tabular statement of my own practice in regard to root-crops; not that I presume to offer it as a rule for others, but in the hope of its doing some good, at least to such farmers and gardeners as have perhaps less experience than myself. I make the statement for two reasons; first, because we hear no inquiry more frequently made by beginners in farming and gardening—nay, often by old practitioners, than about the best distances at which to plant or to drill the various plants which they cultivate. And secondly, because this very necessary information is not to be found in any one book of husbandry or horticulture that I have ever consulted. Many of them are sufficiently full and explicit in other respects, but all are more or less guilty of omissions in regard to distances. On this subject I now offer what I have culled from books, confirmed by my own observation of the practice of others, and by numerous experiments made by myself with most of the specified roots.

<i>Kinds of roots and other plants.</i>	<i>Distances of drills or hills.</i>
Irish potatoes, - - -	2½ feet by 16 or 18 inches, if planted whole, 3 feet each way, if in hills.
Ruta-baga, - - - -	2 feet by 10 or 12 inches.
Sugar-beet and mangel wurtzel, - - - -	18 inches by 8 or 10 inches.
Parsnips, - - - -	Do. by do.
Carrots, - - - -	From 9 to 12 inches by 5 or 6 inches.
Salsafy, - - - -	Do. do.
Jerusalem artichoke, -	From 3½ to 4 feet each way, one or two tubers in a hill.
Common artichoke, -	Do. do. 3 slips or sets in a flat hill.
Asparagus, - - - -	From 9 to 12 inches each way, either for roots or seedling plants.
Cabbages, - - - -	2 feet by 1 for early kinds, 2½ by 18 inches for late.
Kale, Siberian and purple cabbages, - -	1 foot by 4 inches.
Cauliflower and broccoli, -	From 4½ to 5 feet each way.
Brussels sprouts and variegated kale, - -	Same distance as late cabbages.
Spinach, - - - -	9 or 10 inches by 5 or 6 inches.
Lettuce, - - - -	10 or 12 inches by 8 or 9 inches.
Radishes, - - - -	6 or 8 inches by 3 or 4 inches.

<i>Kinds of roots and other plants.</i>	<i>Distances of drills or hills.</i>
Cucumbers, - - - -	3 feet each way for early, and 4 feet for late, both in flat hills, or 3 feet by 1, the rows supported by sticks.
Musk melons, - - -	From 4 to 5 feet each way, in flat hills.
Water melons, - - -	From 6 to 8 feet each way in flat hills.
Early bunch cimlins -	3½ feet each way in flat hills.
Running squashes of every kind, and pumpkins, - - - - -	5 or 6 feet each way, if quantity rather than size be the object, and in flat hills.
Early garden peas, -	From 3 to 3½ feet, sown very thick.
Late tall garden peas of every kind, - - -	From 5 to 6 feet sown thin.
Early dwarf snap-beans of every variety - -	2½ feet by 3 or 4 inches.
Late running snap-beans scarlet runners and Lima beans, - - -	4 or 4½ feet each way, in flat hills.
Okra or gombo, - - -	2½ feet by 12 or 15 inches on level surface.
Onions, - - - - -	12 or 15 inches by 4 or 5 inches on level surface.
Celery, - - - - -	4 feet by 6 or 8 inches, in well manured trenches.
Tomato, - - - - -	3 or 4 feet each way in flat hills, the vines to be supported by 3 or 4 sticks around each hill.

The above table I have taken, (as I before remarked,) partly from books, and in part from the oral information of experienced farmers and gardeners, confirmed by my own experience, having long cultivated, at different times, nearly every vegetable which I have enumerated. Some few I have omitted altogether, because I have never seen them at any table, nor scarcely ever heard them commended by any persons who had tasted them. It is possible that the whole table may appear to some to be nothing more than telling every one what they knew before; but, for the reasons already stated, I am sure that many will find it convenient to refer to it, at least in regard to the distances at which each kind of vegetable should be sown or planted. Of the seasons for these operations I have said nothing, as they vary very much according to soil, climate and the temperature of the weather in each month. But many of our common almanacs give the requisite information as to the proper seasons for planting and sowing in each latitude; and nearly all the old gardeners, every where, can tell those who are ignorant. There are, however, two subjects connected with the table, on which I will add a few "more last words." These are, the best kinds of manures, and the culture especially of root-crops. In regard to the first, I believe myself to

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be warranted by some 30 or 40 years' observation and experience, in saying that the differences between all the vegetable and vegeto-animal manures, when applied in equal quantities, consist much more in the *degree* than in the *nature* of the fertility imparted, simply because one bulk, where all are of the same size, will contain more of the food of plants than another. Let me not be understood as asserting that there is no difference whatever in kinds. All I contend for is, that it is far less than some reputed scientific agriculturists would make it: and that in many of their apparently learned descants on the subject, so common in our old books of husbandry, especially when they come to speak of their complicated composts and expensive stercoraries, there is much more of quackery, than real utility, particularly to the farmers and planters of our country. I have always found that the manure either of horses, cows, sheep or hogs, or ashes, all of which most of us can procure more easily than other kinds, would cause all the varieties of plants usually cultivated here to grow quite as fast and perfectly, as any compost I have ever seen tried, if applied in proper quantities, and at the proper time. I have also found, in regard to all the vegeto-animal manures, that it is best to apply them as fresh as possible, provided they be mixed with the soil, in time for the fermentation to be nearly or quite over just before the seed which you design to cultivate are sown or planted. In this state much less manure will suffice, which saves labor in the application, and prevents the loss that inevitably happens when fermentation takes place before the manure is incorporated with the earth. Where plants appear to be "burnt" by manure, (as 'tis commonly said,) the effect is produced either by excess in the quantity used, or by too late an application, both of which faults are easily avoided. Should these and other manures be too scarce, and hard to procure in sufficient quantities, even for the garden, an excellent substitute may be found in a strong infusion of soot and water, made about the color of good coffee. This mixture almost every one can procure. It should be applied *between*, not *on* the plants, and may be relied on as highly efficacious in bringing them to perfection: three or four times during their growth will suffice.

Before I quit the subject of composts, let me remark that there is one, and which every farmer or planter may prepare, and which I will admit to be well worth making; not because it is at all better than any of the manures which I have mentioned, but because it prevents the entire waste of various putrescent substances to be found on every farm, that are usually thrown away and lost; but which, if heaped together, would soon ferment into a uniform mass, capable, if soon used, of imparting considerable fertility to any of our arable lands. Against all other composts, or rather those which require the costly buildings called stercoraries, to form and preserve them, I must here beg leave to enter a decided protest, at least for Virginia farms. In the first place, the expense of building, together with the labor of preparing and applying the compound, will exceed, unless I greatly err, the profit to be derived from it; and, secondly, the waste of manure, by fermentation, will be very great, notwithstanding all the precaution which may be taken to guard against it; not to mention the in-

tolerably offensive and noxious stench which such places constantly generate, and which none but Flemish or Chinese noses could be forced to encounter without severe compulsion. This objection may, perhaps, appear somewhat too fastidious to those whose olfactory nerves are less sensitive than my own, and therefore I will not urge it any farther than it concerns the health of the laborers who are frequently exposed to such odors. An atmosphere fully impregnated with them cannot possibly be wholesome, either for man or beast, and, consequently, it should be our study rather to prevent than to create them.

On the subject of culture my remarks will relate chiefly to root crops, and are designed principally as a reply to your correspondent's assertion, that, "in the United States, narrow intervals" (by which he means less than three feet) "are inadmissible." Now it is a fact, witnessed by many of my neighbors, that I, who live, as I before remarked, in latitude about $37\frac{1}{2}^{\circ}$, have ventured to admit these "inadmissible intervals" several times, and have had ocular proof, not only that a well broke horse or mule could easily walk between rows of ruta бага two feet apart, without treading on the plants, while it was proper to use the plough, but that there was no discernible smothering whatever of the roots, even of plants whose leaves were three feet long; nor was there any perceptible difference in the quantities of roots produced by the two and three feet drills. The implements used were a single coulter, small enough for one horse, and a small double mould-board plough of cast iron, made for the purpose, which throws the dirt to the right and left at the same time, and thereby aids the hand-hoe in earthing up the plants to the requisite height of five or six inches. For the culture of all plants in drills less than two feet apart, the implements which I prefer to all others that I have yet tried, are the three-pronged hoe, and the common weeding hoe with a narrow blade. The first pulverizes, while it gives the proper depth of tillage; the latter effectually kills the grass and weeds, at the same time that it draws to the roots the necessary quantity of earth. The pronged hoe is so far superior to any thing else I have ever seen, for two other very common operations on every farm, that I think it may probably be useful to give a sketch of it; for it is not used, I believe, nor even known in many parts of our state, although common in others. The operations to which I allude are, the throwing of coarse manure into carts or tumbrils, and the cleaning out the bottoms of ditches or drains, wherein any kind of trash has accumulated. In those matters it will do more than double the work of the implements commonly used, and with less effort to the laborer who handles it. The eye of the hoe should be made like that of a grubbing hoe, and attached to the centre prong, which should be about 8 inches long and one inch wide next the eye, tapered to 5-8ths width at the point. The thickness should also be 5-8ths reduced at the point, to a sharp edge. The outside prongs should be of the same size as the centre prong, and welded to that on the inside close to the eye, and all of them should be slightly curved inward. Let the intervals between the prongs be about 2 inches.*

* If the hoe were laid with its back on the ground, and a line traced around it, by the outside of the outer

This very useful implement, Marshall says, has been used from time immemorial in several parts of England, and is called a "haul-to." Col. John Taylor of Caroline, I believe, first used it in our state; at least I never heard of them before I saw them on his farm, some thirty-odd years ago, and I have never been without them since.

So much for root-culture in drills, and the implements which seem to me best calculated for the purpose. When hills are used, either for roots or other plants, let me earnestly recommend that, instead of making them as usual, at right angles with each other, they should be so made, as for the hills in every other row to be opposite the intervals of the row last made. In this way, although the hills will be the same distance from each other as when they were made at right angles, the rows themselves will be so much nearer in the mode recommended, as to make a difference in its favor of many hundred hills in every acre. This difference will exceed 500 per acre, if the hills be made three feet apart each way, as any person who may doubt my word may easily prove to himself, if he will take the trouble to make the calculation. To those who prefer saving a little extra trouble, to making the most of their arable lands, I would say—"go on, good, easy, self-satisfied souls, as many of your progenitors have been going on for centuries past; far be it from me to presume that you will condescend, even to listen to any thing I can say in the form of recommendation. I venture not upon any attempt so utterly hopeless." My humble efforts are addressed to those only, who, like myself, believe that the best informed among us will always have something to learn; and may always be benefited by the free inter-communication of each other's knowledge and

prongs and the eye, and straight across the cutting ends of the three prongs, the plane surface so marked would be in size and shape much the same as those of a common hilling (or digging) hoe. The slight curve of the prongs is about the same as is most suitable for a common grubbing hoe. The angle which the pronged hoe makes with its handle, is that which suits best for the operation of digging, or which serves to make the prongs strike into the manure or earth precisely in the line of their direction. This useful implement is described in Taylor's 'Arator,' and also in the account of the farming of Fielding Lewis, at page 17, vol. i. Farmers' Register.

The description given above by our correspondent was accompanied by a drawing, which we have taken the liberty to omit; because to wait for an engraving of it to be executed would probably compel us to keep back the publication two months; and, moreover, the figure not being exactly represented by the drawing, it would not have served as a perfect guide for the construction. We never object to the cost of illustrative engravings, and, on the contrary, would be pleased to have them whenever requisite; but the difficulty of obtaining them, and the delay and disappointment in their execution, constitute one of the many drawbacks to the exertions of publishing an agricultural journal in Virginia, where there is no support afforded for an engraver—and very little for a publisher of any thing—except despicable party political writings.—Ed. F. R.

experience. And now, my good sir, hoping that you and your readers may have patience to get through this long epistle, I remain your old friend and co-laborer.

J. M. G.

MANURING WITH GREEN CROPS.

For the Farmers' Register.

Some time last year, Mr. Ruffin requested me to communicate the result of my improvements by ploughing down crops of oats. I have been waiting to have an opportunity of examining a field now sowed down the third year in succession, (the two previous having been given to the land for improvement,) and intended to be harvested this year. Two successive years is the extent of my experience, and as exact results cannot be given, it is with much diffidence I undertake to speak on the subject; yet, with the understanding that I only record my opinions, I proceed.

Suppose one acre of ground, worth \$5, prepared and sowed with one bushel of oats, and the produce be 10 bushels; and the sowing and harvesting thus continued for seven years in succession.

Years	1	2	3	4	5	6	7
Produce	10	9	8	7	6	5	4 = 49
Loss	0	35	70	105	140	175	210 \$7 35
Land damaged to the amount of	-	-	-	-	-	-	- 2 65

Total loss by harvesting, - - - - - 10 00

Suppose the oats ploughed down when sufficiently ripe to vegetate, and the second growth also turned under in spring, and this process continued for six years in succession, but harvested the seventh; then the produce would increase as follows.

10	20	30	40	50	60	70 bushels.
70 bushels, at 35 cents, is	-	-	-	-	-	\$24 50
Add, improvement of land	-	-	-	-	-	45 00

69 50

Off charges seven years - - - 24 50

Total profit by improvement and harvest 45 00

Add original value of land - - - 5 00

Present value of land 50 00

Stock can be put on the crops, sufficient to pay interest or rent.

First case—Original value of land - \$5 00
Off damages - - - 2 65

Present value of land - 2 35

Second case—Present value of land - 50 00

Difference in value - 47 65

Difference in harvesting - 7 35

Difference in processes - 55 00

1st case—Loss by harvesting and damage 10 00

2d case—Gain by improvement & harvest 45 00

Difference as above - - 55 00

First case—Harvested in seven years, 49 bush.

Second case—Harvested one year, 70 bushels.

First case—49 bushels worth - \$17 15

Charges, seven years - 24 50

Loss as above stated - 7 35

Second case—70 bushels, worth - 24 00
Charges, seven years - 24 00

Balanced - - - 00 00

I make the charges in both cases equal, because I consider the harvesting in the one case equal to the additional fallow in the other case.

Years.	Profit if crop be cut 1 yr.
1 - - - - -	\$0 00
2 - - - - -	3 50
3 - - - - -	7 00
4 - - - - -	10 50
5 - - - - -	14 00
6 - - - - -	17 50
7 - - - - -	21 00

By ploughing down oats for nine years in succession, I suppose the produce the tenth year would be 100 bushels, which I would willingly take as a maximum; although I have lately noticed in the Cultivator that a Yankee has harvested 130 bushels the acre.

This year I intend to begin sowing millet for improvement; first taking off rye, when in bloom, for hay; then turning down the stubble and sowing millet; and when the millet is in bloom, turning this down and again sowing rye. As millet delights in a dry soil, I suppose it would, on such, be preferable to oats; but the oats would be preferable to millet on damp clay.

I have sowed rye on an oat fallow, which is well, provided it be not on stiff clay; but in this case the deeper deposited oats are apt to appear in spring, to the damage of the rye. I have known a sufficiency of volunteer oats to rise, on clay grounds, for the production of a crop, without tillage or additional seed; but such are of weakly constitution; therefore, I would prefer ploughing and sowing, whether for improvement or harvesting.

My present impression is, that all things considered, I would prefer oats and millet to any other crops, for improvement; but I deem it proper to state that I have never tried any beside oats, except clover and herds-grass, and these only on a limited scale.

To him who has a small farm, and a supply of dung, manuring with green crops is out of the question; to him who has much land and little dung, this manner of manuring is in the question. The impatient will receive simple interest; but the patient will receive compound.

Suppose a poor acre of ground desired to be sowed in wheat next fall: then I would now spread dung, and sow oats; ploughing these down when in bloom—say first of June—sow millet; ploughing these down when in bloom—say first of October—sow wheat.

Dung worth	-	-	\$9 00
Preparation and sowing oats	-	2 00	
Do. millet,		2 25	
Do. wheat		2 25	
Harvesting do.		4 50	
			20 00
25 bushels wheat	-	-	20 00
Improvement of land	-	-	25 00
			45 00

Profit, - - - - - 25 00
March, 1840. MOUNTAINEER.

MEMOIR OF A NEW METHOD OF PAINTING
WITH MILK. BY A. A. CADET DE VAUX,
MEMBER OF THE ACADEMICAL SOCIETY OF
SCIENCE.

From the Decade Philosophique.

"I published, in the 'Feuille de Cultivateur,' but at a time when the thoughts of every one were absorbed by the public misfortunes, a singular economical process for painting, which the want of materials induced me to substitute, instead of painting in distemper.

Take skimmed milk, one quart—fresh slacked lime, six ounces—oil of caraway, or linseed, or nut, four ounces Spanish white, say whiting, five pounds. Put the lime into a vessel of stone ware, and pour upon it a sufficient quantity of milk, to make a smooth mixture; then add the oil by degrees, stirring the mixture with a small wooden spatula; then add the remainder of the milk, and finally the Spanish white.—Skimmed milk, in summer, is often curdled, but this is of no consequence, as its fluidity is soon restored by its contact with the lime. It is, however, absolutely necessary that it should not be sour, for in that case, it would form with the lime a kind of calcareous acetate, susceptible of attracting moisture. The lime is slacked by plunging it into water, drawing it out, and suffering it to fall to pieces in the air. For painting white, the oil of caraway is to be preferred, as it is colorless; for painting with the ochres, the commonest lamp oil may be used.

The oil, when mixed with the milk and lime disappears, being entirely dissolved by the lime, and forms, with it, a calcareous soap. The Spanish white must be crumbled, and gently spread on the surface of the liquid, by which it is gradually imbibed and at last sinks. It must then be stirred with a stick. This paint is colored like distemper, with charcoal, levigated with water, yellow ochre, &c. One of the properties of my paint, which we may term *milk distemper paint*, (*Peinture au lait de trempe*), is that it will keep for whole months, and requires neither time nor fire. In ten minutes we may prepare enough of it to paint a whole house; the above quantity being sufficient to paint the first layer of six toises. One may sleep in a chamber the first night after it is painted. New wood requires two coatings. I have since given a greater degree of solidity to this method of painting, for it has been my aim, not only to substitute it in the place of painting in distemper, but also of oil paint.

Resinous milk painting.—For work out of doors I add to the above paint—slacked lime, 2 oz.—oil, 2 oz.—white Burgundy pitch, 2 oz. The pitch is to be melted in oil, by a gentle heat, and added to the milk and oil. In cold weather, the mixture should be warmed, to prevent the pitch from cooling, and to facilitate its union with the milk and oil. This painting has some analogy with that known by the name of encaustic."

I would merely observe that I have used the above mixtures more or less extensively for several years, and that I am perfectly satisfied, in my own mind, that by proper attention in mixing and applying, it may be made, not only a cheap and economical, but a durable substitute for ordinary paints. Its appearance, when applied to the exterior of buildings, is more beautiful than that of the best German lead—having a fine glossy sur-

face, and when put on by a workman, equally as impervious to water. EXPERIMENTALIST.

From the Farmers' Monthly Visitor.

IMPORTANT EXPERIMENT WITH POTATOES.

Dear Sir:—Having taken notes of the result of an experiment made by Mr. Newell Whitney of this town, in the cultivation of the potato, which shows a very great saving of labor, as well as increase of the crop, I have thought it important that it be made known to the readers of your valuable journal.

Although the introduction of the Rohan potato is, I believe, destined to be of more value to this country than the richest mines of gold and silver, yet it will necessarily be several years before its cultivation can become general; until which time, if one half or two thirds the labor of cultivating the more common varieties can be saved, and at the same time the crop largely increased, our farmers should know it.

Last spring Mr. Whitney broke up a piece of greensward, harrowed it thoroughly, carted upon it manure from the yard, at the rate of thirty-two loads to the acre, cross ploughed it, harrowed it again, and planted it in the usual manner in hills. At the proper season, after ploughing between the rows, the piece was well hoed, which operation in due season was repeated. In the fall he dug from this piece, at the rate of three hundred bushels to the acre, which for this year, on account of the rust, was considered a great yield.

By the side of this piece, on precisely the same quality of soil, manure from the yard was carted and spread, at the same rate of thirty-two loads to the acre; the sward was then carefully turned over, and the furrows were laid flat with the roller. Between every other furrow, where they came together, (that is, between the first and second, and between the third and fourth, and so on,) holes two feet apart, were made with a sharpened stick, about three inches deep, large enough to receive the seed. Into each hole one piece of potatoe was put, and the holes filled up with mellow soil, even with the general surface of the field. There was no further labor bestowed upon the crop till the digging, when the quantity produced was a little over four hundred bushels to the acre.

Both pieces were planted with the same variety of seed, mostly the common white, and also with in the same week. The latter piece however came forward earlier, grew more luxuriantly, and soon completely covered the ground; and although never hoed, not a weed was to be seen in it. Before digging, the field had the appearance of having been well hoed, the potatoes having raised up the ground above them.

The amount of labor bestowed upon the last mentioned piece, including the digging and putting into the cellar, was at the rate of fourteen days' work to the acre. In this estimate the work of the team is included, and considered equal to that of a man. This fourteen days' work at the price for labor and board of hands, at the season when expended, I shall estimate at ten dollars, to which add two dollars, the value of eight bushels of potatoes, the quantity per acre planted, at twenty-five cents per bushel, and we have twelve dollars

as the whole expense of the crop, which will make the cost of the potatoes only three cents per bushel.

The manure I do not take into the account, except the labor of getting it out, as it is an article that costs the farmer nothing, although of the first importance. It may be considered the tribute which the husbandman must pay back to the soil, as a return for the bounties received, and without which it will cease to reward his labors. Besides, the potato is generally planted as a preparatory crop, to fit the ground for the subsequent crop of wheat, to which, and the crop still to follow, the manure should be charged.

The price of potatoes in the field last fall was twenty cents per bushel, being higher than usual on account of the general short crop. This will give the very handsome profit of sixty eight dollars from one acre of land, after paying all expenses.

The intelligent farmer, by comparing the two modes of cultivation, will readily see the great saving in labor, in that last described, which, if the crops were merely equal, would be of vast importance: but when we find the crop one quarter greater the advantage of its general adoption would be incalculable. As a preparation for a crop of grain, the next season, the two modes are yet to be tested: but from the statement of Mr. Whitney, that, although twice well hoed, and although he went over the piece once and pulled up all the weeds he could find, from the wetness of the season it was impossible to keep the weeds down, and many were found to have seeded, I should suppose the piece hoed might be in no better state for a crop of grain, than the other.

For the benefit of those farmers who have not yet procured that useful implement, the roller, I will state, that Mr. Whitney doubts whether its use in his experiment was of any advantage, and that he will dispense with its use, at least in part, the next season. He thinks the potatoes will extend their roots further, and thereby receive greater advantage from the manure, if the furrow should not be pressed down by the roller.

It may be proper to add, that neither of the above described pieces contained an acre; but the ground was carefully measured, as well as the crop, and an accurate account kept of the labor expended, from which the calculations were made, for the accuracy of which I will hold myself responsible.

I am, sir, very respectfully,
Your obedient servant,

JAMES A. PADDOCK.

Craftsburg, N. Jan. 27th, 1840.

CULTURE OF THE PEA.

From the Cultivator.

Mr. E. Bishop, of Washington co. Md., has requested some information on the culture of the pea—"the best kind for field cultivation—the time of sowing—the quantity of seed per acre—the best mode of preparing the land—the best mode of harvesting—and the best mode of feeding.

The pea is one of the most valuable crops grown in the country, not only on account of its own intrinsic worth, but for its use as a preparation for other crops, particularly wheat. In all our wheat

districts it is therefore extensively cultivated, and here as in England is considered next to the root crops as a preparative for that grain. The soil best adapted to the pea is one that is good for wheat, and where that grain is certain, peas may be considered so. The preparation of the soil demands nothing peculiar; it must only be made in good order for seed, in the manner required for other spring crops, by being well ploughed, harrowed, and if necessary manured. If manured too highly, however, the vine or haum is apt to be too abundant, and the pea itself inferior in quantity and quality. In this as in most other cases too great a growth of vine or straw is incompatible with great crops of pulse or grain. Lime in all countries has been found an essential ingredient of pea or wheat soils: and where it does not naturally exist in them, should be applied previous to attempting the culture of these crops.

The kinds of pea most usually cultivated as a field crop, are the small yellow pea and the marrowfat. We prefer the latter; as it is equally certain with the other, is excellent for the table as well as for feeding, is as nutritious for animals, and generally more productive. In some situations, or in exhausted soils, the small yellow pea may however be preferable. From thirty to forty bushels per acre is not an uncommon crop, and this highest amount is often exceeded. The quantity of seed required per acre may be stated at two and a half bushels, although some use only two, and some put on three bushels per acre. For covering the pea the cultivator is a very good implement, as it gives them more earth than the harrow and less than the common plough. The ground should be left smooth by the roller or otherwise, as the ease of gathering is greatly dependent on the state of the surface.

In harvesting the pea some farmers hook them up with a scythe, some rake them by hand with the common hay rake, but the most expeditious method by far is to use the horse-rake in gathering this crop. In whatever way peas are gathered, it is necessary they should be ripe, and of course if very dry at the time, there will be some loss by shelling, but not perhaps more by the horse-rake than by the other methods, and four-fifths of the time required by the two first methods is saved. This, where the land is to be put into wheat, is frequently of great consequence. Once gathered there is no crop so easily thrashed and prepared for market as the pea, and few that better reward the cultivator.

There is no plant cultivated which will bring pigs forward more rapidly than the pea, if the feeding is commenced as soon as the peas begin to harden, and the whole plant is fed out to them. When gathered and hard, two methods of feeding have been adopted, both of which are far preferable to the barbarous practice of giving swine the pea without any preparation. The first is to soak and swell the pea in milk if it can be had, if not, in water, and feed it to them in that state. The second is to grind the pea, either alone or with other coarse grain, and feed it to animals in that way. This is preferable to feeding whole, as in corn or any other food, the finer it is made the more readily it will be assimilated, and in all cases if cooked into pudding the advantage will be decisive. In England where corn cannot be grown, a mixture of peas and barley is considered

superior to any other food for making pork; here, closing the process of fattening with Indian corn as giving more firmness to the pork, is preferred.

The greatest enemy the pea has to encounter is the *Bruchus pisa*, or pea-bug, which deposits its egg in the young pea by perforating the pod, and the larvæ or grub of which remains in the pea till the period of transformation. To avoid this enemy some have proposed to use seed that was two years old, as in this case the seed must be free from the insect. Others have proposed to sow so late in the season as to have the period in which the bug deposits its egg pass before the plant blossoms or the pod forms. To do this the pea must be sown as late as the 10th or 15th of June. The pea is a very hardy plant, little liable to be injured by late spring frosts, and hence, when intended to be followed by wheat, or required for an early market, they should be sown as soon as the ground can be fitted for their reception in the spring.

ROOT CROPS.

From the Maine Farmer.

Mr. Holmes:—Among the improvements which of late years have taken place in agriculture in our country is that of the increased attention paid to the cultivation of root crops. Some writers when treating of the importance of root culture have run into the extreme in the most extravagant manner. Some writers have gone so far as to recommend the growing of roots as the chief or almost the only dependence of the farmer for the winter support of his cattle. Now this I consider to be a theory at war with nature herself if not with common sense. To undertake to feed a large stock of cattle, on roots alone, through the winter, is, to say the least, an Herculean task. But good agriculture requires that grass crops be grown for the benefit of the soil. The farmer who does not often change from grass to tillage, and from tillage to grass, is at war with vital principles and his lands will in a short time suffer for lack of fertility. To cultivate roots largely is excellent husbandry; but the scythe, the rake, and the pitchfork should not be neglected. In No. 7, of the Farmer your correspondent, "A. F." endeavors to prove the superiority of corn, grain, roots, &c. compared with hay as food for cattle. If a proper rotation of crops is absolutely necessary in order to preserve the fertility of the soil, no further argument is wanted to show the propriety of largely cultivating grass crops. But let us talk of the profits of grass crops as we go along. Our soil and climate in Maine are admirably adapted to the growing of grass crops. How much hay may be raised to the acre and what is hay worth per ton. Land under the hand of the skillful farmer may be made to yield four tons per acre and is worth ten dollars per ton to the farmer who keeps none but animals of a superior quality; to the farmer who keeps inferior stock hay is not worth six dollars per ton. Four tons of hay per acre, at 10 dollars per ton, give 40 dollars; and when we take into the account the small amount of labor necessary to cut and secure the hay crop, and the accession of fertility to the soil, there is an income sufficient to satisfy eve-

ry calculating farmer. There is more nutriment in hay than many farmers imagine; ruta бага is not worth as much pound for pound as hay for keeping stock. Some farmers are to be found who think that to raise roots for stock is consummate folly. Now this is running into the extreme the other way. Every farmer should grow roots to feed his stock through the winter and increase the quantity of his hay crops by every possible means. How many bushels of ruta бага are equal to a ton of hay? say 200 bushels. This makes the ruta бага worth only 3 cts. a bushel, if hay is worth only 6 dollars a ton. But some farmers have valued their ruta бага at 20, 25 and even 30 cts. a bushel, and then triumphantly told the public what tremendous profits per acre they had realized. I think my experience has proved that a ton of good hay contains as much nutriment as 200 bushels of ruta бага. Now let us make some calculations as to profits; an acre of land that will yield 4 tons of hay will yield 1600 bushels ruta бага which at three cents per bushel will give a profit per acre of 48 dollars (not bringing labor in to the account), but suppose that 1½ ton of hay and 50 bushels ruta бага will keep a cow through the winter in as good, or better condition than with 2 tons of hay without roots; this will raise the value of ruta бага to 6 cents a bushel, and the profit per acre to 96 dollars. Roots aid in digesting the dry food, and in that case the animal receives more nourishment. Perhaps it may be found most profitable to feed our neat stock, in the proportion of 3 or 4 of dry fodder to one of roots. But ruta бага is worth still more for sheep and is most excellent for horses. Three bushels ruta бага given to horses will save to the farmer one bushel of oats; this will raise the value of ruta бага to about 11 cents per bushel, and the profit per acre to about 176 dollars. Potatoes are much better food than ruta бага, for neat stock except milch cows, and and for these, potatoes are preferable if they are cooked. Now let fair experiments demonstrate which are most profitable, beets or carrots. For milch cows beets and carrots (especially when cooked) are excellent. Of all roots the beet is most palatable; the hog is very fond of good living, the more his appetite is gratified, the more he will thrive. It may be important to ascertain which contains the most nutriment, the beet or the carrot, bushel for bushel? which makes the most palatable pork? the richest milk? which root is most easily raised? Except on light soils, I think the beet will yield a greater product than the carrot. I will not say at this time, what kind of beet, whether the red beet, the sugar beet, or mangel wurtzel beet is to be preferred, but experiment can determine the case.

A gentleman of Penobscot county says, "Has it not been proved to demonstration that beets are unfit as food for hogs?" I should be glad to examine the gentleman's demonstration, and ascertain whether it is really logical or fallacious. Hogs in Oxford county will eat beets greedily and thrive very well. Now suppose that 1600 bushels of beets may be raised upon an acre, which I verily believe can be done, and if worth 12½ cents per bushel to feed or fatten swine, will give a profit of 200 dollars per acre. To profitably raise beets, carrots, &c. the soil should be thoroughly cultivated and manured. I would rather hear a farmer tell how skillfully he manages his beets,

carrots, &c. than to hear him boast how many acres he cultivates in such crops.

In a few years we can demonstrate which are best for swine, beets or carrots. Although I think it an evidence of a good farmer to cultivate roots largely, still I think that Indian corn should have its proper share of manure, for in our state, corn crops unaided by manure must be exceedingly light. Perhaps there may be at this time some diversity of opinions among farmers in regard to root culture, but well directed experiments will correct all errors and establish facts whether theoretical or practical.

R.

Rumford, March, 1840.

CULTURE OF RAPE.

From the Cultivator.

We are not aware that any efforts have been made in this country to introduce the culture of rape, which in England and on the continent is deemed one of the most valuable of crops, and enters extensively into all their systems of rotation. According to Decandolle, there are two kinds of this plant; one the *Brassica napus*, the one commonly cultivated in Great Britain; and the *Brassica campestris*, the one usually grown on the continent, and according to him the most productive. In England it is frequently called *coleseed*, and in France and Germany *colsa*, but in both countries is highly prized for the excellence of the oil its seeds yield, and the value of the rape cake for feeding animals, its qualities in this respect resembling the oil cake from linseed. According to Decandolle, the *B. campestris* has a rough, the *B. napus*, a smooth leaf.

Rape, as its name *Brassica* indicates, belongs to the cabbage or turnip family, but it never heads like the former, and its roots are of little value compared with the latter, yet it forms an excellent green crop for feeding sheep, and when grown for its seeds, is excelled in profit by few other crops. It is biennial, that is, it requires two years to complete its growth, and ripen its seeds; being sown in July, and perfecting its seeds in the August of the coming year. When used for fattening sheep, the plants are fed off green in the fall, in the same manner as the turnip. According to Loudon, the place which a rape occupies in a rotation, is between two culmiferous or grain crops. "On rich soils it may be succeeded to the greatest advantage by wheat, as it is found to be an excellent preparation for that sort of grain; and by its being taken off early, there is sufficient time allowed for getting the land in order for sowing wheat."

The preparation of the land for rape is the same as that required for cabbages or turnips, and the soil which suits the last will be the best for the first of these plants. It may be sown broad cast or in drills; suffered to stand where sown, or be sown in beds and transplanted, but in any case the ground must be kept clear of weeds, and the plants properly hoed and thinned. The mode of culture is essentially the same as that of the turnip. When grown as food for sheep it is sown earlier, is fed off by animals on the ground, as the turnip, and wheat is sown immediately after; when grown for seed, it is sown later, and the seed

being gathered in July or August, wheat follows.

In Notes on the Agriculture of Germany, by Mr. Carr, an English gentleman, he says the after course is as follows:

- 1 year, fallow, well dunged.
- 2 " rape.
- 3 " wheat.
- 4 " barley.
- 5 " peas, light dunging.
- 6 " rye.
- 7 " oats, with rye, or timothy grass

seeds, and red clover.

The clover and peas plastered in May. The clover is mown twice for hay, and left two years for pasture, when it is heavily manured, fallowed, and again sown with rape. "The rape seed is sown broad cast in the last of July or first of August. This crop is greatly benefited the following spring by dusting gypsum over it, about one hundred pounds to the acre. In July the seed is ripe, and as the weather is generally fine, is trodden out by horses very expeditiously on large canvass sheets in the field. The oil of this seed pressed out, when purified, is without smell, gives a brilliant, clear burning flame, and is universally used all over Germany, in the saloon of the rich and the cottage of the poor. The value of the crop is somewhat precarious, because it is subject to so many contingencies; the turnip fly, and caterpillar prey upon it when young, and when in flower, a small beetle (*Haltica nemorum*) often eats away the blossom bud, or lays its minute larvae in the petals, ultimately furnishing every seed pod with a maggot, which either eats the seeds away, or forcing the pod open when nearly ripe, causes it to fall out. When spared these calamities, it is, however, a very remunerating crop, worth from 10*l.* to 20*l.* an acre, especially if there is a foreign demand. The straw is generally burned, and the ashes scattered over the field; it is sometimes sold to the soapmakers, who prize it highly. Two furrows are now given for wheat sown broad cast in September."

We can see but one serious obstacle to the culture of rape in the northern states, and that is the rigor of our winters, which might endanger the safety of the plants; an obstacle of course that would not exist farther south. That it would be valuable, could it be safely cultivated, there can be no doubt; the oil and the cake would insure such a result. In many instances, on good lands, the proceeds of the first crop have more than equalled the price of the land. If any of our readers have attempted the culture of this plant, we should be pleased to learn the result, that we may give it a place in the Cultivator.

THE GARGET.

From the Maine Farmer.

Mr. Holmes:—In No. 5, vol. 8, of the Farmer, Mr. Henry Butman notices a piece written by me over the signature of J. W. in a former number, wherein he makes me the author of the notion that tar applied to the noses of cattle subject to the garget at certain seasons, was a preventive. In that piece I adverted to an article which appeared in vol. 6, number 10, where it is said that an experienced farmer in Litchfield had made the discovery.

I wrote to inquire who he was, whether the author was known, whether he was to be attended to or not, as good authority,—how much tar was to be used, and if he ever knew a poor milker to be affected with it, &c. &c. I did remark that if a preventive so simple, and so easily applied, was a sure one, it was a valuable discovery. But I doubted then, and now doubt, as well as Mr. B. I had no idea that so discerning a man as Mr. Butman would take me to be the author of that prescription, nor will he if he reads again. I am always pleased with his remarks, for he is not afraid to intimate something new. This he has done, in doubting or denying that such a disorder as that called garget exists in cattle. But in the same breath he urges the adoption of a preventive, which is more frequent milking when highly fed. A good milker's bag will become distended—the milk curdled, and of course she is injured, and if he had said that the disorder called garget by common consent, (Mr. Butman excepted) is thus produced, there would have been less anomaly in his logic. Pray, Mr. Butman, do not disorders always arise from a cause—high keep, or something else? I had so believed. I am aware that certain things are seen in animals which do not produce injury, such as the turning of the fluids or secretions of the body, if I may so express myself, to bone, hoofs, nails, wool, hair, horns and the like; this is the order of Providence, and not similar to a wound by a sharp instrument, or the disorder called the garget, produced by high feed, &c. There is generally much in Mr. Butman's remarks as published, worthy of notice, and the piece alluded to, about our allowing our cattle to injure one another with their horns, when it may be so easily prevented, is of consequence.

I hope we shall yet hear from the Litchfield correspondent. J. W.

N. B. If the public had chosen to give the name garget to that disease of the cow, manifested by an enlarged bag, caused by high feed or the want of being milked often enough, I doubt if Mr. Butman or I can hinder it.

A SELF-MADE MAN—THE LATE JUDGE BUEL.

(From the Eulogy on his life and character, pronounced before the New York State Agricultural Society, Feb. 5, 1840. By A. Dean, Esq. of Albany.)

The subject of these remarks was born in Coventry, in the State of Connecticut, on the fourth day of January, 1778. He was the last born, and the last that has died, of a family of fourteen children. His father, Elias Buel, held the commission of major in the war of our revolution, and was a fair sample of the plain, unassuming, straight-forward character of the New England farmer.

As an instance in proof that the end of the good man is peace, it deserves to be mentioned, that the advanced years and declining strength of this excellent sample of New-England's earlier population, together with his aged consort, received for the last five years of their lives their stay and support from the filial affections of their youngest child; until, fully matured, and at the advanced age of 86 years, they both left this world, and as if their union had become indissoluble by bonds that

had been tightened by nearly three fourths of a century, they left it within the brief period of six weeks of each other.

When he had arrived at the age of twelve years, the family, including himself, moved from Coventry to Rutland, Vermont, and two years afterwards, when he had completed the age of fourteen, he became an apprentice to the printing business, in the office of Mr. Lyons, in Rutland.

The young apprentice distinguished the first four years of his term by a close, assiduous, and unremitting attention to the attainment of the printing art.

In June, 1797, he formed a connexion in business with Mr. Moffit, of Troy, and commenced the publication of the Troy Budget. This was continued until September, 1801, when, at the age of twenty-three, he married Miss Susan Pierce, of Troy, and immediately moved to Poughkeepsie, where, in connexion with Mr. Joiner, he commenced the publication of a weekly paper, called the Guardian. This was continued about a year; after which, he entered into another co-partnership, and commenced the publication of the Political Barometer. This last proved to be an unfortunate business connexion; and after about a year's continuance, either through the mismanagement or dishonesty of his partner, he found himself reduced to utter bankruptcy.

This is, I am sorry to say, rather a common history; and many, thus situated, abandon hope; and yield themselves up to fatal despondency. Not so Judge Buel. With the unshaken assurance of success which naturally results from the firm determination to deserve it, he saw, with apparent indifference, the slow, labored, and rather scanty accumulations of some six or seven years suddenly swept from him; and read, in this lesson of mutability, at least the chance of elevation, as well as depression, in individual condition. He never, for one moment, lost confidence in the general integrity of men, nor in the ultimate success of industry and application. He left Poughkeepsie and removed to Kingston, where he established a weekly paper called the Plebeian. Here he continued during the period of ten years, from 1803 to 1813, applying himself with diligence and activity to his business. During a part of this time, he sustained with reputation the office of Judge, in the Ulster county court; and by his persevering industry, and well directed application, he not only retrieved his losses, but also acquired some considerable real and personal estate.

In 1813, his reputation as an editor and a man having made him favorably known to the public, he was induced, through the exertions of Judge Spencer and some others, to remove to the city of Albany, and to commence the Albany Argus. The next succeeding year, 1814, he was appointed printer to the state, the duties of which, together with the editorship of the Argus, he continued to discharge until the year 1820; at which time he sold out with the determination to abandon the printing business.

It is worthy of remark, that while engaged in this business he always performed himself the labor essential to its successful prosecution. He was always the setter of his own types, and until he came to Albany, the worker of his own press. Is there not something in the very nature of the printing art, that tends to originate and perpetuate

habits of severer industry than any other occupation or calling?

After disposing of his printing establishment and business, he purchased a farm of eighty-five acres of land near the city of Albany, which then helped to compose that tract of land lying west of the city, and appropriately denominated the "Sandy Barrens." That which, for some years past, has been so extensively and favorably known as the "Albany Nursery," then lay an open common, unimproved, covered with bushes, and apparently doomed to everlasting sterility. These unpromising appearances, which, to a common mind, would have presented insuperable obstacles, served to increase the efforts, rather than damp the ardor, of Judge Buel. Difficulties, hindrances, obstructions, were with him every day familiars. His mind had been in some measure formed under their influence. He recognized and acted on the doctrine, that where God has done little, it is incumbent on man to do much; and that nothing in this world is ever lost by courting situations that require the expenditure of unremitting effort. Man was made to labor, both corporeally and mentally, and his happiness in life depends much more than he is generally aware of, on the strict obedience which he yields to his primal law of his being.

On this farm he continued to reside until the time of his death. Under his untiring and well directed industry, the most unpromising indications soon disappeared, and as a practical commentary upon the truth of his agricultural doctrine, and in proof that he in reality practised what he preached, it may be mentioned that the same acre of land, which in 1821 he purchased for \$30 is now worth, at a moderate estimate, \$200.

While residing on his farm, since 1821, he has several times represented the city and county of Albany in the popular branch of the Legislature of this state; has been for several years, and was at the time of his death, a regent of the University; and in the fall of 1836 received the whig support as their candidate for the office of Governor of the state of New York.

He retired to his farm at the age of forty-three; a period of life when the mind has attained the full maturity of its varied powers. He carried with him a sound body, the result of a good original constitution, of strictly temperate habits, and much active exercise in the prosecution of his business; and a mind well stored with valuable information, of a character the most available for the common uses and purposes of life. So far as his pecuniary circumstances were concerned, he might, at this period of time, have been justified in dispensing with further labor, either of body or mind. He was no longer compelled to act under the spur of necessity. But his ready perceptions, and accurate feelings, convinced him of a truth, which others are often doomed to acquire from a sad experience—that a life of labor is, of all other kinds of life, the last that should be terminated by an age of inactivity. Men violate the laws impressed by God upon the condition of things, when they assign to their declining years an inglorious ease in the expenditure of that fortune, which the successful industry of their manhood had accumulated. There is also in all highly gifted minds, that are endowed with clear, strong intellect, combined with conscientiousness, a deep feeling of responsibility for the due exercise of their powers, in a manner the

most advantageous to their fellow-men. God has placed a double safeguard over the advancement of man, by leaving the means that conduce to it in charge both of the impulses that originate from self, and of the promptings derived from his high moral nature.

The mind of Judge Buel fortunately had the sagacity to perceive both where his industry was the most required, and could be rendered the most available. Of the three great interests that divide between them the labors of men, viz:—the agricultural, the mechanical and manufacturing, and the commercial, it is not difficult to perceive that the first has long been the most important, and the most neglected. The last, or commerce, is much dependent on the other two, and may always be expected to flourish where either agriculture or mechanical and manufacturing arts yield their multitude of products. Between the other two there is a mutual dependence; agriculture furnishes the support of life, the mechanic arts, in their turn, supplying the instruments of agriculture. Of these two, the mechanic arts had received relatively much the most attention. To advance them, man's ingenuity and inventive powers had been severely tasked; and science was required to furnish its contributions; and the devising and employment of labor-saving machinery attested, and in a variety of instances, the triumphs of mind over the inert materials every where abounding in nature.—But while the mechanic and manufacturing arts was thus prospering, agriculture was allowed to labor on unaided, and unenlightened in the knowledge of itself. The new and virgin earth on this continent, that had been for ages rearing and receiving back into its bosom the tall tree of the forest, and the waving grass of the prairie, required, at first, in many places, but a small quantity of labor to ensure ample returns. When the soil began to give evidence of exhaustion, instead of attempting its restoration, new fields were brought under the dominion of the plough. The great mass of agricultural population, so far as their business was concerned, were little more than creatures of habit. Men lived, and labored, and trod the same paths, and performed the same circles of action, with scarcely a single well settled principle for their guide, except that the same field ought not to be taxed to grow two successive crops of flax. The principal, and almost the sole object in view, was to realize as great immediate returns as possible from the smallest amount of labor, without any regard whatever to the exhausted condition in which they might leave the soil; much like the traveller, who seeks the rapid accomplishment of a long journey, by driving so far the first day as to destroy his horse.

The new system of agriculture, with which the name and reputation of Judge Buel is essentially identified, consists in sustaining and strengthening the soil, while its productive qualities are put into requisition; in rendering the farm every year more valuable, by annually increasing both its products and its power of producing; like the traveller, who instead of destroying his horse the first day, should so regulate his motion, and administer his supplies of food, as to enable him to make additional progress every successive day, until the completion of his journey. This new system—new I mean in this country—has been principally carried into effect by manuring, by draining, by good till-

age, by alternating crops, by root culture, and by the substitution of fallow crops for naked fallows.

The efforts of Judge Buel have greatly tended to make honorable, as well as profitable and improving, the pursuits of agriculture. He clearly perceived that to render the farming interest prosperous, it must stand high in the public estimation. So long as it was conceded to be an occupation that required little more than mere habit to follow, and that it was indifferent to success, whether the man possessed great intellectual power, or a mind on a level with the ox he drove, it could not be expected that any would embark in it unless necessity compelled them, or the very moderate extent of their mental bestowment precluded any reasonable chance of success in any other. He taught men that agricultural prosperity resulted neither from habit nor chance; that success was subject to the same law in this, as in other departments of industry, and before it could be secured, must be deserved; that mind, intellectual power, and moral purpose, constituted as essential parts in the elements of agricultural prosperity, as in those of any other; and all these truths he enforced by precept, and illustrated by practice. By these means he has called into the field of agricultural labor a higher order of mind; has elevated the standard of agricultural attainment; and has tended to render this extensive department of industry as intelligent, respected, and honorable, as it ever has been conceded to be useful, healthy, and independent.

Thus gifted, esteemed, beloved, distinguished, and in the enjoyment of reputation co-extensive with the agricultural interest in this country, it would seem, that if life were a boon worth possessing, he had almost earned a long and undisturbed enjoyment of it. But the dispensations of God to man are full of mystery. Religion and reason here teach the same lesson: to observe, adore and submit.

He had accepted invitations to deliver addresses before the agricultural and horticultural societies of Norwich and New Haven, Connecticut, on the 25th and 27th of September last. About the middle of that month, he left this city for that purpose, accompanied by his only daughter. On Saturday night, the 22d of September, at Danbury, Connecticut, he was seized with a bilious colic. This was extremely distressing, but yielded, within three days, to the force of medical treatment.—A bilious fever then supervened, unaccompanied, however, by any alarming symptoms until Friday the 4th of October. His disease then assumed a serious aspect, and a change was obviously perceptible, particularly in his voice. He had occasionally, during his sickness, expressed doubts of his recovery, although his physicians up to the 4th of October, entertained no serious apprehensions that his disease would terminate fatally. He retained throughout the full possession of his mental faculties, and expressed his entire resignation to the will of Heaven. He continued gradually to decline from Friday until about three o'clock in the forenoon of Sunday, when, after faintly uttering the name of his absent companion, with whom he had shared the toils, and troubles, and triumphs, of almost forty years, he calmly, and without a groan or a struggle, cancelled the debt which his birth had created, and "yielded up his spirit to God who gave it."

As a writer, the merits of Judge Buel have already been determined by a discerning public. It is here worthy of remark, that he never had but six months' schooling, having enjoyed fewer advantages, in that respect, than most of our farmers and mechanics' sons. He, however, had the good fortune to possess a mind that could improve itself by its own action. Although, therefore, he lacked the advantages of that early education, which can polish, point, and refine good sense where it happens to be found, and endeavors to supply its absence by some imperfect substitute, where it is wanting; yet by dint of study and practice, and of strong original endowment, he succeeded in the attainment of a style excellently well adapted to the nature of his communications. It consisted simply in his telling, in plain language, just the thing he thought. The arts of rhetoric, the advantages of skilful arrangement in language, the abundant use of tropes and figures, he never resorted to. He seemed neither to expect nor desire, that his communications would possess with other minds any more weight than the ideas contained in them would justly entitle them to. With him words meant things, and not simply their shadows. He came to the common mind like an old familiar acquaintance; and although he brought to it new ideas, yet they consisted in conceptions clearly comprehensible in themselves, and conveyed in the plainest and most intelligible terms.

His writings are principally to be found in the many addresses he has delivered; in the six volumes of his *Cultivator*, in the small volume (made up, however, principally or entirely, from materials taken from the *Cultivator*), published by the Harpers of New York; and in the "Farmers' Companion," the last and most perfect of his works, containing within a small compass, the embodied results of his agricultural experience, a rich legacy, to which the great extent of our farming interest cannot remain insensible. This work was written expressly for the Massachusetts Board of Education, and constitutes one of the numbers of the second series of that truly invaluable district school library, now issuing, under the sanction of that board, from the press of Marsh, Capen, Lyon and Webb of Boston; which for the extent of the undertaking; the great caution exercised in selecting the material; the talent enlisted in furnishing it; and the durable manner in which the books are executed; so richly deserves the patronage of the whole American nation. I deem it really the most fortunate circumstance in his life, that he should have been permitted, so immediately previous to his departure, to furnish just this volume, for just this purpose: and I shall confidently expect that the coming generation will be better farmers, better citizens, and better men, from having had the formation of their young minds influenced to some extent, by the lessons of experience and practical wisdom, derived from the last, best, most mature production of this excellent man. The several district schools throughout our state, will undoubtedly feel it due to the important trusts they have in charge, to secure this among other valuable publications, to aid in composing their respective district school libraries, from which so much good is expected to be derived.

NOTES OF A STEAM JOURNEY.

*By the Editor.**Wilmington and its Railway.*

At 1 o'clock, A. M. April 14th, I left Petersburg, Va., in the southern steam carriage, and at 7 P. M. reached Wilmington, N. C., which was later than usual, owing to several causes of delay. Distance, 181 miles.

The newly finished Wilmington railway (of 163 miles) is the most level and straight route, of any of considerable length, in the world; and being well planned and constructed, as well as on so remarkable and admirable a location, it necessarily is an excellent road. It seems also to be well managed—a matter which is as important to success as all the other requisites put together.

The construction of a railway of such great length is a rare instance of bold enterprise on the part of a community so small, and necessarily so deficient in wealth, as the people of the little town of Wilmington; for to them is entirely due the credit of the enterprise, and principally the successful consummation of the work. This road makes, together with the Raleigh and Gaston, and parts of the Petersburg and Roanoke, Portsmouth and Roanoke, and Greenville and Roanoke rail-roads, more than 300 miles of railway, finished and in regular use, within the state of North Carolina. Making every allowance for the aid of investments made by the citizens of Virginia in these great works, the results, brought about too in the last few years, speak loudly in favor of the enterprise of the "old north state," which has been jeered as being the Rip Van Winkle of the American confederacy, or as *asleep* in regard to public improvements. Perhaps Rip was aroused from his long sleep rather too early, after all. At any rate, it would have been far better for his immediate neighbors, both north and south, if they had remained asleep fully as long.

There being not sufficient accommodation at the public houses for the entertainment of so many visitors, we were met, upon our arrival at the depot, and divided among the principal inhabitants, like so many captives, except for the intention not being hostile, but hospitable, and entertained in the kindest manner during our stay.

The next day was the festival, to celebrate the recent completion of the rail-road, to attend which, as an invited guest, I had so far diverged from the point to which my previous engagements called me. An enormous length of tables was filled by upwards of 600 guests, and the dinner passed in the usual manner of all such entertainments.

Of Wilmington it may be said, almost literally, that it stands on a mere sand bank. This I had heard before of its site, but did not realize the truth of the description. The ground is not level, as I had supposed from the very level surface of the country in general. On the contrary it is quite hilly. The elevations are hills of almost pure sand; and having very much the appearance of their having been formed by the wind on the ancient shore of the ocean. Judging from the absence of all vegetation in the open parts of the town, I at first thought that I had, for the first

time, seen land either too poor or too sandy to produce (naturally) a blade of grass. Such, however, was not exactly the state of the case, as I found afterwards by walking out in the adjacent country.

The enterprise of Wilmington is conspicuous in other things besides its great rail-road. The thickest settled and business part of the town was all burnt but a few months ago; but there are already indications that the ruins will soon be replaced by new and good buildings. A new church, of the Gothic order of architecture, is, to my eye, the most beautiful structure, and the most appropriate in design to its purpose, of any modern building known.

Steam Mills of Wilmington.

There are five steam saw-mills in operation in Wilmington, which together saw 100,000 feet of plank a day; and another nearly reconstructed, which had been destroyed by the late fire. There is also a steam mill for hulling rice, and one for planing, and tonguing and grooving flooring plank. This last operation is as wonderful, to one who sees it for the first time, as inexplicable before seeing it, on hearing it described. The planks are first cut to even width by a circular saw, which passes through with great rapidity. The plank is then passed through the machine for the main operation; and in a few moments it comes out finished. The plank passes at a regulated course through two rollers. The planing is effected by four cutting edges, which turn around an axle, and which cut like broad adzes, but with an inclined edge and stroke. These whirl around with such rapidity as to appear to the eye a solid iron cylinder, and to leave the spectator doubtful as to how the planing is done. On each side are other circular cutters, striking horizontally, at the same time, and with cutting edges differently shaped, so that one cuts out the groove, in one edge of the plank, while the other, working opposite, cuts so as to leave the tongue which is to fit into the groove of another plank. This mill, as well as one of the saw mills, we understood to be the property of Mr. Lazarus, our hospitable host.

Rice fields and their culture.

The tide of the Cape Fear river, at Wilmington, rises about four feet perpendicular. The opposite shore (in Brunswick county) was an extensive marsh or tide swamp, which has been ditched, and is cultivated every year in rice. This is indeed the principal culture in this part of the country, for market, as not enough corn is made for the consumption of the inhabitants, and very little other grain raised. The ditches and banks and flood-gates are so arranged that the tide-water can be brought over the ground, or let off and shut out, at discretion. This command of fresh water is essential to productive culture. The rice is planted in narrow drills. The water is then let on, by some planters, and by others it is kept off until after the plants have come up, and have been once weeded. In the other case, the shallow water is drawn off for the weeding. In both cases, the water is then thrown on again; and while its cover helps the aquatic plant, rice, it effectually keeps down all the weeds that would otherwise in-

jure the crop. The water is kept on nearly through the whole time of growth, but not quite, as that would render the growth too "spindling" and feeble. The product is very great, and also the profit. Still I cannot but consider the culture of rice as a curse to any region, as it must cause the production of malaria and its consequent diseases. This did not seem to be admitted by the inhabitants of Wilmington, and the rice planters, or, if admitted, but little importance is attached to it. An intelligent young planter, of whom I made some inquiries on this head, told me that he expected, as a matter of course, to have an attack of bilious fever every year; but he did not appear to think that of much account.

I crossed the river to see a rice field. The plants had but just come up, and there was nothing to be seen that was interesting. About 15 miles lower down the river, at Dr. F. Hill's plantation, when passing in the steam vessel, I saw the rice ground flooded. The river water is there mixed with the salt of the ocean, and would kill the rice; and therefore fresh water is brought by a canal from a large pond, distant several miles in the country.

As I supposed, from my experience of embanked tide lands on James river, these rice grounds, wet as they are kept, and therefore the soil less liable to decomposition, are annually rotting away and sinking; and some have been thereby made worthless, and thrown out of cultivation. But, as to these grounds at and above Wilmington, there is a counteracting operation of the river freshes, which bring down and deposite on the land mud enough to compensate for the waste of the original soil by decomposition. The rice grounds lower down the river are therefore most subject to this lessening of the height; and these are *black soils*, while those higher up the river are brown, or "mulatto" land, that color being given by the deposite of sediment left by the river during freshes. The present and ordinary color of the river is the clear coffee color caused by vegetable dye, and which belongs to all the rivers of lower Carolina, except the great Roanoke, which flows from limestone and other clear sources in the mountains of Virginia.

Steaming to and from Charleston.

On the 16th, at 2 P. M., our party proceeded, by the steam sea line of the Wilmington rail-road company, to Charleston, S. C., 180 miles, which full distance was passed over in less than 15 hours. At 5 P. M. of the 17th, we set out on our return, and the next morning, before 8, we were again at the Wilmington wharf. The steamer is one of four belonging to the company, the best for speed, safety, and accommodation; and the weather was as delightful and as favorable as could have been desired. There was nothing for me to desire, except relief from the necessity of leaving Charleston in so short a time, and upon the first visit. But so far as could be in the space of the few hours spent there, I was highly gratified with all that was seen and met with. Even that short time did not prevent the offer of hospitable attentions from entire strangers, which though but the common characteristics of warm-hearted southerners, were not the less appreciated.

As a hearty well-wisher, though personally a

stranger, to the commercial capital of South Carolina, I was as much gratified as surprised to see how far and how well it had already recovered from the desolating effects of the great fire which but a few years ago swept over so large a portion of the city. But for the knowing of that great calamity, and the looking for its destructive effects, I should scarcely have guessed that so much of the city had been so recently destroyed.

The inertness and indolence and improvidence of my southern countrymen are unfortunately so conspicuous in my own state, as well as elsewhere, that I had taken up the opinion that these defects were to be seen the more strongly displayed as we proceed southward; and hence I had unconsciously taken up a very improper idea, and made much too low an estimate, of Charleston. Without touching on other matters, the buildings and general appearance of this city are more pleasing to me than of the more populous and splendid cities of the north. In the usual style of this one, there appears to be an unpretending dignity and beauty, and in some cases even grandeur, combined with simplicity. In this respect, Charleston may be likened to a gentleman born and bred, simply but perfectly well dressed, compared to a mustachioed dandy and exquisite. Indeed, it seemed to me that the population contained a larger proportion of those who appeared to be gentlemen than I had ever seen in any other city; and, for some time, I believed that not a pair of *moustaches* disgraced the city; but I was compelled to learn otherwise, by seeing before my departure several specimens of these ape-imitating "lords of creation."

The Battery is a newly constructed and delightful promenade along the border of the Cooper river, extending to the point of junction with the Ashley. The pavement of the wall is of very broad flat stones, with a low railing next the water, and open to the prospect of the harbor and islands below. The beauty of this view was enhanced still more when seen from an upper apartment of a splendid old mansion to which we were invited by its owner, and in which I was told had been entertained my distinguished countryman who was sent as mediator and ambassador from Virginia to South Carolina, both acting in their capacities of sovereign states. I had always felt proud of that occasion, as to both commonwealths, and was gratified to have now re-awakened, by the narrative and the scene, emotions which I had felt so vividly.

In the rail-road and steamboat route from the Roanoke to Charleston, there is nothing to be desired by the traveller, except the removal of the existing cause of detention of travellers and the mail, at Wilmington for 17 hours. This remarkable delay in a journey so rapid in all its other parts, is now made necessary by the want of lights to direct at night the course of the difficult navigation of the Cape Fear river. If this were done, it would only be necessary for the southern train from Charleston to wait two hours later than at present, and it would receive the mail and passengers a day earlier than now, and the whole journey would be expedited 15 hours to Charleston and all southward, without any additional speed while moving. If the Cape Fear river was north of Washington, it would have been lighted by government, and properly so, even if only for

private commercial benefit. As it is, it has been long asked for in vain, even though there would actually be a great national benefit secured by the government, in the more speedy transportation of the great southern mail.

A sandy desert. Predaceous and carnivorous plants.

The country adjoining Wilmington had to me an entirely novel and very remarkable appearance. The original large growth of pine trees had been cut down for fuel or timber, and had been succeeded by an almost unmixed growth of thinly set dwarfish "shrub" oaks which rarely rose higher than six feet. The surface of the earth was but half concealed by the fallen leaves, and the scattered tufts of coarse grass; and pure and perfectly white sand was visible in so many places on the surface, amidst the green vegetation, that the general appearance was as if a snow had recently covered all the ground, which had melted in some places, while it still remained on others. I never saw any land so nearly approaching a sandy desert. This worst appearance here does not extend far back from the town.

But this barren and unsightly soil, and the adjacent country which is not greatly better, is the paradise of botanists. I was informed that there are found more species of plants growing naturally within ten miles of Wilmington, than in all Massachusetts; and one-third as many as are given in Elliott's catalogue of all the plants of South Carolina and Georgia. I had new cause to lament my ignorance of botany, when in a region so interesting to the better informed. Still, I did not lose all the gratification to be derived from some of the most remarkable of these beautiful works of nature.

In the grounds around Wilmington is found in abundance the wonderful *predatory* (if not actually carnivorous) plant, called "Venus' fly-trap," (*Dionaea muscipula*), of which a description was published in a former volume of the Farmers' Register. This plant is very small, and was not yet grown, and the largest of the *traps* were scarcely more than half the size they will be hereafter. Still, though not yet possessed of their full degree of *sensitiveness* which I hope to see, (as I had dug up and sent home a box of growing specimens,) they closed with a quickness, and operated with a degree of effect, far beyond my previous conceptions. The catching apparatus is an extension of the leaf. It is in shape much like a very diminutive steel trap, set open for catching, except that the valves are close in the plant, and open frame work in the artificial trap. The teeth around the circumference (forming a circle when lying open,) are long, and when they meet, interlock regularly and perfectly. All the interior is not sensitive. It is only three small and short filaments, on each side, which are scarcely perceptible, that serve as triggers. I saw every other part of the valves touched with a blade of grass, and even with some force, without its affecting the plant. But as soon as one of these filaments was touched by a small bug, the valves instantly and quickly closed together, their surrounding teeth interlocked, and enclosed completely the unlucky intruder, and will remain so closed until its struggles cease with its life. Then, or after the pur-

pose of the death of the insect has been effected, the trap opens, and is ready to make another capture. I cannot believe that this wonderful and admirable apparatus has been contrived by nature, and kept at work, without some object. I cannot but believe that the death of the insect furnishes some benefit to the plant, and that, so far, it may be said to feed upon its prey. These plants grow on the borders of the wet places among the sands. Formerly it was supposed that they were found only in the neighborhood of Wilmington; but they have been since found in Florida, and elsewhere.

There is another bug-catching plant which grows abundantly hereabout, which though not possessing the power of animal motion, and not seizing its prey by an act of mental volition and design, as almost seems to be the case with the other, yet this one is scarcely less curious in its mechanical structure, and its adaptation of form to its object. This is the plant which bears the beautiful yellow flower vulgarly called "side-saddle" or "trumpet-flower," (*saracenia flava*.) It is a large pendent flower, on an upright stem of a foot to eighteen inches high. The very singular and beautiful form of the flower could not be described by me so as to be understood, and therefore will not be attempted. The trap is the leaf of the flower, and of a later growth, for the flowers now are generally fully blown, and some even on the decline, and none of the trap appendages are more than half grown, though the structure is fully shown in them, and also in the old and dry, but still well preserved leaves of last year's growth, which remain, and nearly all of which contain the scaly wings of small beetles, and other undecomposed remains of their insect prey. This leaf is in the shape of a slender trumpet; of very thick tough texture, which is closed at the ground and gradually enlarges to an inch in diameter at about fifteen inches high. On one side of this mouth of the trumpet, a part of the leaf extends and spreads over the mouth, so as effectually to keep out any rain water; and for greater precaution, in the middle of this umbrella is a deep groove, which, as a gutter, conveys the rain water off. The lower and closed end of the trumpet is always filled some inches deep with a limpid and tasteless water, secreted by the plant, which seems to attract insects. They descend into the trumpet easily; but can never return, as the sides are beset with numerous minute hairy filaments, which point downward, and effectually prevent any progress upward of the insects enticed to enter the receptacle.

This magnificent and curious plant is said not to be found much farther north. There is however another of very similar general structure, the purple *saracenia*, which grows as far north as New England. However, I never saw it before, and it would have been considered as admirable for its beauty, and its curious mechanical structure of the flower, and its water-holding and insect-catching apparatus of the leaves, but for the inferiority in all these respects to the more common *saracenia flava*.

As little knowledge of and taste for botany as I have, a longer residence in this neighborhood and sufficient leisure would tempt me to begin the study. It is surprising that this region is not more visited by the lovers of curious plants and beau-

tiful flowers, and that the ready means now offered by the rail-roads are not more used to convey these rare treasures northward. I sent on by the train, in boxes, growing specimens of all the above plants, with their native soil, just dug up, and which must have reached Petersburg in perfect condition; and might so be carried as far as Philadelphia, even should they fail to be kept alive afterwards. In this manner, by proper arrangements, hundreds of rare plants, which even in green-houses cannot be produced in perfection at the north, might be sent, in all their native splendor and vigor, to floricultural exhibitions a thousand miles distant.

General appearance of the lands of New Hanover county.

One of my first objects after reaching Wilmington was to seek out, and make personal acquaintance with Dr. James F. McRee, a gentleman whom I knew merely as the only subscriber to the *Farmers' Register* in or near Wilmington. I drew the inference, in which I have rarely been mistaken, that a man who had thus appreciated my labors for seven years, would probably be one both able and ready to aid me in acquiring information. I was not mistaken. In addition to the pleasure derived from Dr. McRee's general conversation, and to his kind and serviceable attentions in other respects, I was indebted to him for much of the information in regard to the peculiarities of this region, and its products, which I was enabled to acquire. My first inquiries of him were in regard to the extent of the marl formation of this region, (having previously seen it in Wilmington,) and I heard from Dr. McRee such interesting facts on this subject, that I was very willing to accept his invitation to accompany him to his farm, Ashmoore, near Rocky Point, the most favorable portion for observation. For this place we set out on the 17th.

In a mile or two from Wilmington, along the ordinary carriage road, the excessive sandiness of the soil changes to rather less of that character, and to such as is general through the pine lands for many miles. The general growth is long leaf pine, thinly set, with very little undergrowth of trees or shrubs. The surface of the earth is set with tufts of what is here called "wire grass," but which (as might be inferred from its locality,) is altogether different from what is called by that name in Virginia. This grass, as Dr. McRee informed me, (and to whom, by the way, I am indebted for all the botanical names here used,) is the *aristida stricta*. It grows in small tussocks. Each spire is a single straight upright stem, cylindrical and as regular in shape as a wire. This is the most general grass in the poor pine woods, and open grounds of same quality. When burnt off in the spring, as is most usually done, the young grass springs out more rapidly, and furnishes good grazing all over the country.

The surface of the land, like that of the last 50 or 60 miles seen along the rail-road, is almost a level. The slight depressions are all of swampy character, and are called "bays" or bay land, because the loblolly bay tree (*gordonia lasianthus*) is always found in such places. But whether dry or wet, all these pine lands, and the shallow "bays" intersecting them, are very poor, and,

without being furnished with the calcareous ingredient which they want, are, and will continue, worthless for tillage. It is from such pine woods, which cover so large a part of eastern Carolina, that the great supplies of turpentine and tar are obtained, the making of which is almost the sole business of the residents of the pine lands.

The calcareous lands of Rocky Point.

Upon reaching what are termed the Rocky Point lands, the marks of soil changed from the indications of the basest to those of the most valuable calcareous lands. Rocky Point is a low bluff of the limestone peculiar to this remarkable region, jutting out on the north-east branch of the Cape Fear river. The stone or the softer marl (or that which may as correctly be called *chalk*, as the harder is *limestone*), forms the continuous and nearly horizontal substratum of all this neighborhood, and comes so near to the surface of a body of some 6 or 7000 acres, as to give to it a peculiar and well established character for great fertility, and power of long endurance of continued cultivation of the severest kind. A small tide water creek, which passes through the Ashmoore farm, marks the middle of this body, and on each side of it are the best of these celebrated Rocky Point lands. They are there best, no doubt, because the surface is lowest, and the calcareous substratum is nearest to the surface. It is sometimes so near that the plough turns up a white slice upon the top of the black soil; and in these, and many other places, where the cause is the same, though not so manifest to the eye, the productiveness of the land is greatly impaired. This injurious effect, however, is greatly increased by the too great wetness of the soil, owing to its level surface, its absorbent and sometimes close and adhesive texture, and especially to the solid calcareous sub-stratum, which prevents the surplus water escaping downward by filtration. The land too has not been cultivated in beds (or ridge and furrow,) which, if properly executed, and with the necessary ditches, I am sure would make the lowest acre abundantly dry. There are no springs rising to the surface that cause wetness, but only the surface water from rains to guard against; which is a very simple and sure business. The soil, in quality and in level, and in its calcareous substratum, is more like the famous low grounds of Gloucester and Back River in Virginia, which have been described at length in former volumes of this journal, than any other known lands. I never saw soil that seemed of better natural constitution and quality than some of the fields of Ashmoore, or which promise better rewards for their cultivation.

The limestone is but an accumulation of pure shelly matter, solidified into stony hardness. The marl is the same in chemical composition, but about as hard as chalk, and has very much the texture of an impure chalk, and is soft enough to be used as manure without pounding, burning, or other mode of reducing. I analyzed, on the place, three specimens which were selected as fair samples; and Dr. McRee, before, with the aid of my portable apparatus, had examined several others. The general proportion of carbonate of lime in both kinds was fully 95 per cent. One specimen only, of marl just dug and hastily dried, yielded as little

as 88 per cent.; and as this was the only one so poor, by 6 per cent., I suspected that it had not been sufficiently freed from water, in drying. However, at any rate it is the richest and most valuable marl I have ever known, and the easiest to be used. The stone, of course, would require to be burnt; and it will yield excellent lime, for cement or for manure.

The lowest parts of this body of land, not yet cleared, are swamp, called "white oaks;" not because white oak is their general growth, and indeed it is very rare there—but because such are the only places on which a white oak tree can be found in this part of the country. These swamps are covered with the trees that are most favored elsewhere by the richest, stiff, alluvial, and wet bottom lands. The calcareous bed lies near the surface of all these swamps or "white oak" lands.

Dr. McRee has taken great pains to introduce grass husbandry on his land, and his clover is wonderfully productive. That sown on the first of March, 1839, was fit to mow, and was mown for hay the same year, in July, and the hay sold and delivered in market within eight months of the sowing of the seed. This is a remarkable proof of the admirable fitness of the soil for clover; and it was particularly valued by me, as the strongest known proof of what I have so often maintained, that if the soil be but made calcareous, the warmth of climate of North Carolina, or even farther south, is no bar to profitable clover culture. Before my practice proved otherwise (after marling) it was as firmly believed that lower Virginia was too hot to produce clover to profit, as it is now generally (and as erroneously) believed of lands 200 miles more southward.

But though the calcareous deposit beneath the Rocky Point lands is richer and more easily accessible, than any known elsewhere, it is but the most remarkable case of a formation that is spread through a vast region of the state, accessible throughout a great part of its extent, and which would be highly profitable to be used wherever it can be obtained. I knew before that marl had been found along the Neuse and some of the upper waters of the Chowan, and that it had been used to some small extent by a few individuals; and I inferred, that if sought for, it might be found at some greater or less depth, almost every where between the granite range and the sea coast. But I had never heard of a single actual discovery farther south than the borders of the Neuse and Trent. In addition to what I saw in Wilmington, (though the stratum of marl there is thin, and the limestone poor,) and at Ashmoore and the surrounding lands, I learned from Major Gwynne, the able engineer who directed the construction of the Wilmington railway, that marl was found in the wells dug at the water stations of that road, through the distance of 60 miles from Wilmington. And this marl lies either under, or near enough for transportation to the wretched pine lands, which, wretched as they now are, need but to be marled to become valuable and productive under tillage. I may now, as heretofore, urge this improvement, for this region, in vain; but a time will come when the value of this neglected means of improvement will be properly appreciated in North Carolina, and when the putting it in use will add millions of dollars to the productive wealth of this region, which, of all within my knowledge, is

most favored by nature, and the favors so offered are most slighted by man. And though I have not yet seen the continuation of this region through South Carolina and Georgia, I entertain no doubt but that my remarks would there be applicable.

It would seem as if the Rocky Point land, so deservedly noted hereabout for its fertility, owes its value to its being so thinly spread over the calcareous deposit, that the two earths have necessarily become mixed, by various natural causes. When the roots of trees, and even small plants, can strike through the upper poor soil and into the marl below, the parts of the latter which are taken up into the plants, at their death and decay are finally left on the surface. Thus, in the lapse of ages, the surface, no matter how destitute of lime, and how poor, must thus be made calcareous and rich. But not so if the surface soil be but six or even four feet above the marl, and cut off by a barren intervening subsoil, which the roots of plants are not able to pass through. Then the soil will remain poor; and so it would, even if within a foot of the marl below, but for the operation of plants or animals in bringing up the marl to the surface.

In accordance with these views, where the land is higher, it is very inferior to the best kind; and at a few miles from the river, a still higher elevation of surface becomes either the ordinary poor pine forest land of New Hanover county, or savanna, of which I shall speak presently.

The texture of the calcareous substratum of the Rocky Point lands is altogether different from any of the numerous marl beds I have seen in Virginia. In chemical constitution, and in hardness, much of the former may be properly called by its common name of "limestone;" and by the same tests the balance might be called *chalk*, slightly adulterated, and tinged with a very little foreign matter. But geologists, I believe, do not admit any true chalk to be in this country; and the concretion of shells to a stony hardness, cannot make the *limestone* so called in mineralogy. However, in agricultural sense and use, they are truly what these names would imply.

If the people of Carolina who have the means of marling would apply the lesson afforded here, it might be considered that here God had marled, and thereby enriched the land, and had thus revealed to man the mode of improvement. The enriching of these lands was effected simply by natural marling, with the additional aid of freedom from exhaustion, and thereby the accumulation, and fixing in the soil, of as much vegetable matter as the calcareous ingredient could combine with.

The limestone is not disposed with any regularity as to the softer marl. Isolated masses of the former, of various sizes, are seen scattered over the best fields; and sometimes the stone, and sometimes the chalk is nearest to the surface, or the one over the other. The ditches generally reach the calcareous substratum. When in the chalk or marl, the excavation is easy enough. But when the stone is opposed, blasting by gunpowder is necessary to open the ditch. I saw in two ditches where this last had been done, for stretches of 200 to 300 yards each. Still, Dr. McRee told me that this ditching by blasting was not very difficult, and, as he thought, was not more expensive of labor, than to ditch through newly cleared forest land. There are some other unex-

pected peculiarities of a limestone region in this neighborhood, and even at some miles from the calcareous soils. These are subterranean caverns and subterranean streams. The former are like the limestone caves of the mountain region, except for their very narrow dimensions, which forbid any passage or examination. A small dog has been known to make his way through a subterranean passage for several hundred yards. I saw, at Ashmoore, one of the "natural wells" which show subterranean streams. This was in a field not of calcareous soil, and was about the size across of an ordinary artificial well. The water stood at about two feet from the surface of the earth, and is supplied by a perpetual stream passing through below. The water, however, is now higher than usual, owing to additional supply from rain.

I heard that a little marl had been used in some of the gardens of Wilmington; but not the least use of it has as yet been made on fields, by any south of the Neuse and Trent, of whom I have heard.

The Savannas.

There are, in many places in New Hanover county, and other of the south-eastern parts of North Carolina, interspersed among, and surrounded by forests, tracts of open grass land, called savannas, as clear of trees as if made and kept so for cultivation. These meadows, however, are altogether formed without the designed aid of man; and if cultivation has ever been attempted on them, it was found profitless, from the unproductiveness of the soil, and the attempt was abandoned, after the first trial. The railway passes immediately through one of these savannas, about 27 miles from Wilmington, which is said to contain more than 4000 acres in one body. My passage through this piece was so rapid, that nothing could be distinguished as to its particular growth of grass, or the nature of its soil. It only presented to the eye one unbroken and unvaried expanse of level surface, as much elevated, apparently, compared to the road-way, as the forest lands, and covered with young grass, the deep verdure of which was made the more conspicuous by the old grass having been burned off early in the spring. To examine this kind of land more closely, was one of the objects of my visit to Ashmoore, under the guidance of Dr. McRee. Part of his estate is one of these savannas, which is partly seen from the rail-road just north of the Rocky Point depot, and 15 miles from Wilmington. This savanna is of small extent, being only 200 to 300 acres, but in every other respect is similar to all the others, and would serve, as I was told, as well for observation as any number of them.

I found that but a very small part of this savanna had been burnt over this spring, which gave a better opportunity of judging of its usual growth from the still abundant remains of the dry grass of the last summer. This was of many different kinds, all of which seemed new to me, or if not new, so altered by difference of soil as not to be recognized. However, my examination in this respect was necessarily very slight, owing to my ignorance of the scientific arrangement and descriptions of plants. The principal growth seen consisted of the *aristida stricta*, (before mentioned as being general through the pine-covered

land,) and a dwarfish kind of broom sedge, which is smaller than, and different from, those so well known in lower Virginia, but which was not the less manifestly one of the members of that family of grasses, (*andropogon*), all of which, I infer from my experience of the habits of some of them, must indicate by their growth an acid soil. The old growth, notwithstanding all the eating and trampling by cattle, seemed but little diminished, and had stood about two feet high.

I dug into the soil of this savanna, and at the place examined, a spot rather higher and therefore then drier than the general surface, found the depth to be about a foot. This, however, was more than usual. Along the side of the ditch made to form the rail-road, where it passes by the out-skirt of this savanna, the soil was about 6 to 9 inches deep, and less generally than 6 inches through the adjacent pine land. The soil of the savanna land is as black as earth can be, is moderately stiff, showing the presence of enough clay to form a productive soil for grasses and wheat, and would be supposed, if judged merely by the eye, to be as rich, and valuable for tillage, as in fact it is poor and worthless, as now constituted. The subsoil is a pale yellowish sand, with barely enough clay intermixed to be adhesive, and not to prevent water passing through and saturating it. Still lower, as I was told, lies a bed of clay, which, no doubt, forbids the descent of the rain water, and causes the general wetness of these lands, though they lie high, and are free both from springs, and from floods from any higher lands.

There does not seem to be any great difference between the savanna land and the great body which is covered with pine forests, except in the difference of covering plants. Indeed, in many parts of the pine lands, where the trees stand but thinly, the savanna grasses cover the ground, and where burnt off, present the appearance of a true savanna, with the addition of a sprinkling of trees. The same general causes operate with more or less force on all this immense region of pine forest land; and, according to the degree of force, certain places either become open and perfect savannas, or remain as forest land.

I was the more interested in examining the savanna land because of my former investigations of the causes of the formation of the western prairies. I was not before aware of the existence of any lands of that character in all the Atlantic slope of the United States. But the Carolina savannas are certainly true prairies, though differing so much both in nature of soil and in degree of fertility from those of the west; and the first formation and continuance of these savannas may be satisfactorily traced from the operating causes which were set forth in the essay on the formation of prairies, commenced at page 321, vol. iii., of *Farmers' Register*.

The whole of the great region of pine forest in lower North Carolina, with the exceptions of the intervention of rivers and of swamps, is high land, of as level a surface as can be conceived. Without any springs rising to the surface, which would be the sources of marshes, and with a climate in which dryness and warmth predominate greatly over moisture and cold, it might be inferred that such lands, and sandy as they are withal, would be very dry. But though no springs rise to bring water from subterranean sources to the surface

soil, and though the vast extent of surface alone is security against any considerable effect, even on the western borders, of inundation from higher lands, still there are sufficient causes why these lands should be very wet through the greater part of the year. The almost perfect level of the surface prevents any considerable quantity of the fallen rain-water from flowing away to the rivers and swamps; the sandiness of the soil, and still more of the subsoil, serves readily to drink in the rain water; and the close nature of the clay below forbids the excess of the water thus taken in to sink lower, and therefore it must fill the entire soil and subsoil, for several feet in depth, until drawn up and carried off slowly by evaporation, during the driest part of summer and autumn; and which evaporation is much retarded by the general shade of pine forest over nearly the whole of this great region.

These circumstances are sufficient to show why wetness of the earth should generally prevail, even in the drier times of much the greater part the year; and why every heavy rain should so fill and overflow the surface of the land, whether forest or savanna, and serve to make any dry walking impossible soon afterwards, in any direction. During two or three months of the driest season, it is true that all these lands, savanna as well as forest, become perfectly dry. But that does not prevent the growth and general circumstances of the land being governed and directed by its opposite condition of wetness, which continues for three-fourths of the year.

This general state of moisture of the land is particularly favorable to the growth of grass; and though all the grasses both of calcareous and rich soils are necessarily excluded by the chemical constitution and poverty of this soil, there are enough of other grasses which are best nourished by the acid quality of soil which must exist here, and which is poisonous to all the most valuable plants of cultivation. The poverty and acidity of the soil also forbid the growth of the kinds of trees which flourish best on rich and well-constituted wet lands, as the poplar, ash, black-gum, maple, &c. Pines, then, the most appropriate and favored growth of dry, acid, and sandy soils, form necessarily the almost sole growth of this great region, though the general state of moisture is unfavorable to their greatest vigor. Thus it may be supposed that there must be a general disposition of the growth of trees to give way to the growth of grass, whenever there are additional and strongly operating auxiliary causes of support given to the latter. These causes are presented in the several following cases: 1st, whenever the soil is more stiff, or the lowest clay sub-stratum rises nearer to the surface, and either, or both, serving to retain more of the rain water at and near the surface; or, 2d, when the vegetable matter in the soil is deeper and more abundant, and being not fully decomposed, is of a peaty nature, (a consequence of the preceding named condition, and which is always the case in the savannas,) and which therefore is still more unfriendly to the growth of trees; and 3d, the burning over of all the forest land in the spring, which is almost universally done, and which must damage a weakly growth of trees more and more by every repetition, and thereby allow a greater growth of grass, and of course more of the fuel furnished by the grass for suc-

ceeding burnings. It is where all these circumstances are combined, that, by the gradual destruction of the trees by fire, the savannas have been formed, and will be maintained as long as the same causes continue to operate.

The savanna I examined most closely was within three miles of already discovered marl, of the rich quality above stated; and it would be a cheap improvement to bring and apply it to the savanna; and I am confident that marling, and draining, (which also could be easily effected,) would make this savanna excellent land for wheat and clover, as well as for corn or oats. But the improvement might probably be made still more cheaply, as the bed of marl doubtless lies under it, and most of the other savannas, and might be obtained either immediately from below, or elsewhere, more cheaply than by carriage for even three miles. The railway offers sufficiently cheap transportation for lime, or the richest marl, to considerable distances.

The drainage of savanna, might be effected by the plough, and by the same operation that would best prepare it for cultivation. If attempted, I would advise the ploughing of the land during summer, when dry enough, by a three or four-horse plough, into very wide beds, (say of 26 feet, if for 5 corn rows, or 19 feet if for 3 rows each,) with deep and clean water-furrows between the beds. As soon as the surface had become somewhat closed, another ploughing in the same order and manner, would raise the bed still higher, and nearly double the depth of the water-furrow. It would only then need that all the water-furrows should discharge into one or more cross-ditches, cut in the lowest ground, and having sufficient depth and good outlets, and the draining would be complete. The ditches designed to receive the water discharged from the water-furrows, and also any cross ditches required at depressions, might likewise be made principally by the plough, if done before the bedding. Full directions for both these operations have been published in the *Farmers' Register*; that for ditching by the plough, in an article on draining, in numbers 7 and 12 of vol. i., and for the wide bedding in the observations on the Gloucester lands and culture, in vol. vi. I have never seen lands to which both these modes of drainage could be better applied; and if followed by marling or liming, (and without that, all improvement of this acid land would be profitless,) I know no lands which promise better recompense for the expense of the improvement.

But even as they are, the savannas are excellent grazing grounds while the grass is young and tender. The burning was early on the large savanna, (as is usual,) and it already is a beautiful expanse of green, regular and unbroken to the eye of the traveller as a grazed lawn. As yet but few kinds of the numerous wild flowers of the savannas have opened; but in June they are seen throughout, and of various kinds, and successions of kinds continue to adorn every part of the ground until frost.

State of agriculture, and products of the country.

Except rice, made on the embanked marshes of the Cape Fear river, there is but little if any surplus grain made in the counties around Wilmington. The corn required for the support of that

town is partly brought from abroad, and none is exported. There is no where any wheat sown, except lately by Dr. McRee and one of his neighbors on Rocky Point, and the oats are all consumed on the farms where raised. There is but little cotton made; and scarcely any thing for market made from the fine grazing afforded by the savannas and forest lands. As evidence of the abundance of pasturage, I understood that very few persons give any food to their cattle during winter, as they can obtain grazing throughout in the woods and swamps. But the mortality, in spring, from this starvation system, is very great.

There is not much land cleared or cultivated except on the borders of the rivers, and of that I saw but little. In the pine lands there are but a few small patches cleared, and those very poor in product; the almost sole business of the residents being to make turpentine and tar. Even where better lands and better farming are found, the same crop, corn, is generally cultivated without the intervention of any other, either every year, or every second year, as long as the land can bear it. The nearest usual approach to a rotation of crops is, 1st year, corn, and 2d, oats on the best part, and no crop on the worst; and all grazed after the oat harvest, until near planting time next spring, usually, though sometimes the grazing is avoided. Of course no turf forms on land so treated; and it is not ploughed flush, before planting corn, but only "listed," and checked across, and the "balks," broken up after the corn is well up. Yet there is good demand for all grain and grass products, and extraordinary prices paid for articles of small culture, because of their scarcity. For example, the first person who made a business of sending turnips to Wilmington market, sold them readily throughout the whole season for \$1 the bushel; and though another producer has come in since to share the furnishing of the market, the price still has kept to 50 cents the bushel. Both Irish and sweet potatoes grow well; the latter as well as could be desired, and they are made by every cultivator. But they are found difficult to keep later than mid-winter, and therefore are not raised very largely for stock food.

Field peas are planted through every corn-field, by planting 10 or 15 peas on one side, and sometimes on both sides of every stalk or place of corn. This is done before the last ploughing of the corn, and that is the only benefit of tillage which peas receive. As many peas are gathered as are necessary for use, and on the balance, as they stand, the hogs designed for slaughter are turned in, (the corn having first been gathered,) and are allowed to feed at will. Peas alone, when so abundantly consumed, are supposed to cause disease to hogs, (a weakness in the loins,) which is prevented by having a patch of sweet potatoes in the same field, for change of food. The red and cow peas are the kinds most generally planted. It is the prevailing opinion that the making of this secondary crop of peas does not materially lessen the product of corn from the same ground; but no fair experiment has been made to test this important question, and I therefore greatly distrust the correctness of this opinion.

The sweet potato is most favored by a southern climate and a sandy soil, and therefore I should infer must surpass in value, for stock food, and for greatest product of nutriment from a certain space,

all the roots of northern climes, such as Irish potatoes, turnips, beets, carrots, &c. But though the culture of this most valuable southern root is universal on every farm and clearing, as is its consumption on every table, still it is held as a product of secondary and minor importance, and there is nothing clearly established (that I have heard) as to its amount of product, or the preservation of the crop. The risk of rotting in the cellars or other receptacles, and the great cost of planting roots, are great obstacles to extensive culture. Some persons, however, and by various modes, succeed in keeping potatoes sound, until late in winter. But it seems owing to peculiar, and not well ascertained causes, or otherwise it could be done always. Small quantities in cellars made and kept both dry and warm, and also well ventilated, are kept much later.

Pine forests.

From the few fine specimens I had seen of the long leaf pine, on the southern border of lower Virginia, I had expected to see magnificent trees forming the greater part of the vast pine forests of North Carolina. But such is far from the fact. Some few indeed present the noble elevation of straight trunk, and great size, which I had looked for; but most generally, the trees are much smaller, and far from being pleasing to the eye. The long leaf pine is the original and almost sole growth of the drier lands of New Hanover, and even much farther north, as seen along the railway. The short leaf pine, as called here, and which is the "old-field" pine of Virginia, is here, as with us, the universal second growth of the drier lands wherever the first growth has been cleared off. As to the short leaf or common "woods-pine" of Virginia, I have seen none, though I hear that some few may be found.

It is a curious fact, and one much to be lamented, that there is scarcely any reproduction of the long leaf pine throughout the vast region of which it now forms the almost exclusive cover; and that when the trees now living shall have died, there will be almost a total extinction of this beautiful and valuable tree. It is a tree of very slow growth; and probably most of those now living are older than the general settlement of the region, or the existence of the circumstances which now oppose reproduction. The large cones or "burs" of this tree contain numerous seeds, which drop out as the cone opens, and which are eagerly sought and eaten by hogs. This "pine mast" forms the great resource for feeding the hogs while ranging at large, as is the usage. In this way, very few seeds escape to sprout. And of the few that do sprout, scarcely any of the young trees survive the after attacks of the hogs, which root up the young trees, to eat the roots, even when the trees are several years old. Hogs ranging in the woods are quite fond of the tender roots, and the bark of the roots of older trees, and live on this food principally in the winter and spring, after the pine seeds are consumed.

From these causes I presume it is that very few young long leaf pines are to be seen. I noticed them no where except a few in the neighborhood of Wilmington, in riding from that place to Rocky Point. And the appearance of the young long leaf pine is too remarkable not to have

been observed if seen. It is indeed as remarkable for its singular and beautiful form when very young as for its noble size and form when old. One of three seasons' growth (for example) was only a little more than two feet high, and retained at once all the leaves of the three seasons, though in very distinct states. The leaves of the first year, dead and dry, but still firmly set and strong, covered the plant thickly for about a foot above the ground; then the green and vigorous leaves of the last year's growth, for about the same extent; and lastly, the new upright and compact shoots of this spring, one or two and sometimes three, from which the leaves, though formed, had not yet unfolded, and which shoots are each about the size of, and not very unlike in general appearance, a large shoot of asparagus, as it first rises out of the ground. The older leaves are about a foot long, and as thickly set on the single and upright trunk as can be imagined; and the whole plant, of this or of less size, is much like an artificial military plume of enormous dimensions.

The turpentine and tar business.

The making of turpentine and tar is the almost sole business of the thinly settled population of the pine lands. They are generally poor and indolent; yet this business affords good profits even at the present low prices, and enormous profits were made when naval stores were more than double their present prices. Turpentine now sells at \$1.80 the barrel at Wilmington, and it has sold for upwards of \$4. Mr. Lazarus told me that he had paid to a poor white man, who worked singly and unassisted in making turpentine, \$1000 for the fruits of his labor of one year. It is understood that a good hand can attend to 9000 trees, and can secure 200 barrels of turpentine in a year.

In commencing the operation on trees before untouched, a receptacle (or "box") is cut by the axe on one side of the tree, and about six inches above the ground, which is large enough to hold a quart of the fluid turpentine which exudes from the cut sap-wood, and which flows into this hollow from the upper part and sides. The flowing of the sap begins of course in the spring. At the end of a few days, (according to the time and state of the season,) the laborer visits all his trees, dips out the collected turpentine and puts it in barrels. He then cuts from each side of the tree a shallow groove, inclining downward to the box, through the bark and a little into the wood. Into these new cuts the turpentine exudes, and flows down them into the box. The tool by which this operation is performed is called a "shave." It is a circular piece of iron like the eye of a weeding hoe, with the lower edge sharp, and which is attached to a shaft or handle, so as to cut its groove like a gouge, but by being pulled to, instead of being pushed from, the operator. Every time the box is emptied of its turpentine, the "shaving" is extended upward, and thus gradually making the tree bare of bark and of the outer surface of the sap-wood as high as can be conveniently reached, or 15 feet and upwards. This shaving rises about two feet in a year, and thus it takes about seven years to finish one side of a tree. The side edges of the bared surface are carefully kept perpendicular and straight, and not quite to embrace the half of the trunk of the tree. Next, the opposite

side is "boxed," and treated in the same way, taking care to leave a strip of an inch or two of bark on each side between the old and the newer work. Without other cause of decay or destruction, the trees will live and yield well until the sides can be shaved no higher. But the spreading of accidental fires seldom fails to kill the tree earlier. For the entire face of the cutting being encrusted with turpentine, and the wood below being converted to solid lightwood, no trees can be more inflammable; and the fire burns so deeply in, as to kill the strips of living bark by heat, or to weaken the trunk so much that it yields to, and is prostrated by, the next storm. The trees, or parts that escape being burnt, are finally cut up into billets, and the tar extracted from them, by burning them slowly in a close kiln, made by covering the lightwood with earth in the mode well known in every pine country.

It is only the turpentine that retains its fluidity, and is collected in the box, that is considered first-rate. The part that sticks to and hardens above has lost its most valuable part, (the oil or spirits of turpentine,) by evaporation, and when scraped off, which is the last part of the process, is sold at half the price of the fluid turpentine. Of course the expense of land-carriage is a sufficient bar to the production of so heavy and low-priced products, where the distance is considerable.

The turpentine getters are careful every spring to rake away the leaves from the foot of every tree, and to burn the collected trash when it can be done slowly and safely. But they cannot always command the progress of the fires; and from that, or other less carefully made fires, great havoc is often made among the boxed trees.

Where vicinity to market, or cheapness of carriage, permits this business to be in full operation, it cannot last long, as the long leaf pines will be destroyed and will not be renewed. The other kinds of pines are not worth working for this purpose.

On the morning of the 20th, I joined the railway train at Rocky Point depot, and before 2 P. M. reached Goldsborough, (distance 65 miles,) near Wadesboro, in Wayne county, and the necessary place of departure for Newbern. Here I had to wait until 1 A. M., the next day, when, by a stage coach drawn by two horses, but loaded for four, I reached Newbern after dark. Distance 70 miles.

This day's journey was along the general course of the Neuse river, though no where in sight of it, except at Kinston, in Lenoir county. By another mode of travelling, this might have been found a very interesting route; for the calcareous formations, to examine which had been the first object of my intended visit to Newbern, are scattered all along this river. But I could hire no mode of conveyance, other than that of the public stage coach; and even if it had been otherwise, I could not have profited by the change, having no well informed companion to guide and instruct me as to localities. I could therefore do no better than go on to Newbern, trusting to the chapter of accidents for my subsequent procedure.

Judge Gaston's reclaimed Pocoson.

On the morning of April 22d, the day after my arrival at Newbern, I accompanied Judge Gaston

to his farm, about ten miles distant, for the purpose of seeing the large pocoson of which he has reclaimed and has under cultivation between 200 and 300 acres. I had not before had an opportunity of observing, or being correctly informed as to the nature of this class of wet lands, and I was glad to avail myself of the request and invitation which afforded such an opportunity, with the additional gratification and advantage of the guidance and conversation of a companion so interesting and instructive.

The appearance of the still unreclaimed part of the pocoson is very similar to that of most of the great swamps in the drier time of the year. However, none of the uncleared parts adjacent to this improvement are as wet as the whole was at first, as the ditches have had a partial and considerable effect in drying the forest part. The effect of this partial drying is seen in the dying of the large laurels and other trees which require very wet soil for their most perfect condition.

The surface of the land is so level, that it is drained to outlets in two very different directions. The water carried off by both these main ditches is but little, to be collected from so large a body of land which had been absorbing rain water all the winter. The discharge was not greater than I should have expected to find from the existing circumstances, even if there were not a real spring in the whole ground.

The surface of the pocoson is higher than most of the surrounding firm pine lands. The opinion of Judge Gaston is, that the pocoson was originally the ordinary level pine land of the country; that the passage of the small streams of water from its flat surface was afterwards impeded by fallen trees or other obstructions; consequently a new character gradually was assumed, different from its former state of dry land, and approaching first to that of swamp, and next to that of peat, in so much as the progress of decomposition of the vegetable products did not keep pace with that of their production, and therefore that the accumulation was yearly increased and the surface of the land kept growing higher by the increase of the undecomposed vegetable deposit from the trees, and other plants growing thereon. In this state, the waters of rains, as well as those of impeded small streams, would be necessarily sucked up and retained by the great mass, as by a sponge, and the surplus served to overflow the surface during the greater portion of the year. The proofs to sustain this opinion were presented to him in the two facts, 1st, that the surface of this vegetable soil is actually higher than the surrounding firm land; and, 2dly, that light-wood logs and knots, the evident remains of a former growth of large long-leaf pine trees, were dug up often in the ditches, though not a tree of that kind remained standing, or could possibly live on such soil as the pocoson now has. The subsoil is clay, as is the surface soil of the adjacent firm pine lands. Independent of the ditching, the labor of clearing the dense forest of large swamp trees, which covered all this land, must have been enormous. The whole clearing and improvement has been gradually made, and some of the land cleared long ago has been so much exhausted as to be turned out. The balance, now in a single field of corn of more than 200 acres, had the appearance to me of being very rich soil; and some of the best, I was told,

is as productive as almost any land in the country. This reclaimed body of land, extensive as it is, is but a small part of the whole great pocoson. Much of the nearest adjacent land of the same kind, as before stated, is partially dried by ditching, and the large trees have been killed by girdling, for the purpose of extending the clearing.

There is an immense amount of this kind of land in lower North Carolina, very little of which has been reclaimed, or in any way improved. This is not surprising, notwithstanding its great fertility, when the great and expensive labor required is considered, and that the far cheaper improvements which might be made by marling, are almost totally neglected in this part of the country.

I had seen, in passing, the day before, through Jones county, some pine lands approaching in their appearance, as to their grassy turf, the savannas of New Hanover. On inquiry in regard to them, I learned from Judge Gaston that such lands and more perfect savannas were also common in this part of the country, and that one of the latter was on another part of his land, close by where we then were. We rode over it, and I was still more delighted than with those seen before, with the beautiful meadow-like turf which this exhibits throughout. This had been burnt early, and the young grass is more forward, and there are more wild flowers already open or about to open, than on the more southern savannas lately seen. With no labor, save fencing and mowing, I should think that this land would make very good though rather coarse hay, and profitable for sale, as northern hay is a regular article of import and sale in Newbern; and if merely well limed on the surface, and slightly ditched, would be excellent meadow, and produce the finer grasses. I before expressed my opinion as to the advantage and manner of carrying the improvement of such land still farther, for tillage.

I was not aware until recently that alligators were found so far north as this. Formerly they were often seen in the Neuse, and though very rare of late, they are supposed still to inhabit this river. A small one was caught in one of the ditches of Judge Gaston's pocoson. It was also on this farm, not very long after the first clearings of the wild pocoson land, that occurred a memorable conflict with a bear, which was so severely contested against great odds, and with such destructive power of resistance, that the narrative of the circumstances was published at the time throughout the United States, and even in the papers of Europe. Though at the time surrounded and attacked by the overseer and the negroes and their dogs, and assailed with every weapon that the men could suddenly command, the bear seized on the overseer, then the foremost of his assailants, and tore his flesh so as to endanger his life, and would have killed him outright, but for his being drawn away by the negroes by main force. At last, however, the bear was killed, after a longer and more desperate defence than could have been supposed possible for him to make. And yet it was only in defence that he fought; for he continued slowly to retreat, even after being fired at twice, and slightly wounded at each fire, and to the last, always singled out for his attacks the particular enemy that had last struck or wounded him.

Rattlesnakes are also found hereabout, though

but rarely. They are found more frequently near Wilmington, as I heard when there. These also are most forbearing enemies to man, though among the most brave, and dangerous in their defence, when attacked. They not only give warning to the intruder or assailant by their rattles, but will avoid a conflict, or attempting to use their deadly means of defence, as long as endurance is possible.

Most of the lands seen on our ride from Newbern had much more of clay in their composition than I had supposed belonged to this country. On the south border of the Trent, where crossed by our route, the lands have an undulating surface, are very light, and were once among the best high lands in the country, but now are very much exhausted by scourging cultivation, and neglect of all means of resuscitation.

Marl and Limestone of the Neuse and Trent.

My visit to this neighborhood could not have been worse timed, for the accomplishment of its designed object. The court had but just commenced its session and would not rise in a week, engaging in some manner the attention of most of the intelligent farmers, and of course the continual attendance of every member of the bar, of which class was James W. Bryan, esq., the gentleman whose information and invitation had first induced me to promise to visit this region; and which promise has so long remained unperformed, as to admonish me never to make such another engagement. Two other gentlemen who had most kindly and urgently requested my visiting their farms and calcareous deposits, in Jones county, were both absent. Under such circumstances, I would not permit the sacrifice of the time and services which were notwithstanding offered to forward my objects; and after remaining between two and three days at Newbern, I turned my course homeward. A letter from Mr. Bryan on this subject, previously received, and which will be published in this number, will serve to give better information than I could have obtained personally under the existing circumstances.

Very few persons have as yet even commenced to use the marl of the Neuse and Trent. I heard mentioned Messrs. Isaac Taylor, J. W. Bryan, S. Biddle, and J. C. Burgwyn, and the first beginner, the late L. Benners. Mr. Taylor has marled about thirty acres, and must have derived much benefit from it, as I heard of his having good clover on that land. This old gentleman's good farming and improvements were in other respects well worth seeing, and I was sorry that a visit to him, which I had promised him and myself to make, was prevented by the necessity of leaving Newbern a day sooner than I had then intended, so as to be able to avail of the use of the public conveyances.

I have no doubt, however, that the visible and early effects of marl have been small hereabout, compared to the best that might be derived from the use of this manure. Such would be the result that I would anticipate and predict, merely from knowing the general system of tillage in usage, which is more or less exhausting in almost every case, and which therefore does not permit the accumulation of vegetable matter in the soil by rest, and by the prohibition of close and general graz-

ing. Neither the increased general products nor the net profit of marling on land under continual or very exhausting tillage, can compare with those of the like application to lands under meliorating culture. This I would as earnestly wish to impress on the few persons who are beginning to marl in this region, as to induce them to extend their applications of the manure in proper manner.

Odds and Ends.

The journey from Newbern to Plymouth (69 miles) is through a low, level country, much of which is more or less wet, though firm land, and some of it is swamp. The western part of the great Dismal Swamp, is touched by the road.

Within a few miles after passing the town of Washington, the road passes among a number of basin-shaped depressions, which appear precisely like the "sink holes" of the mountain limestone region of Virginia, and which I should attribute to the same cause, that is, to lime-stone caverns having formerly existed below, which by breaking in, under the weight of the super-incumbent earth, have made these depressions. If searched for deeply enough in these sinks, I think that limestone rock will be found.

At about 14 miles from Plymouth, the pines of the forest are generally of the great size which I had been disappointed in not seeing elsewhere. All are deformed by being skinned for extracting turpentine, and in a manner much more wasteful of the product, and promising to be more speedily destructive of these noble trees, than is the case in the great turpentine region seen farther west.

Here I again reached the Scuppernong grape neighborhood. The settlements are much more frequent, and almost every dwelling house has its adjacent arbor covered by one or more Scuppernong vines, forming an object even at this early season very pleasing to the eye, and which in summer must be as beautiful as profitable. It is very strange, that when the expressing the juice of this grape is done so generally, and to such great extent, in this part of the country, that no one attempts to make true wine from it, by proper fermentation. For though what is called Scuppernong wine, if of the best kind, is a delicious drink, it is not a fermented liquor, nor does it indeed deserve to be called a wine. I wish that some of those who prepare the best of this liquor would try to make wine of it, by the process recommended and practised by Mr. Herbemont, in his treatise which was republished in vol. ii. of *Farmers' Register*.

The snug little steamer Fox, (which may claim naval supremacy on the Blackwater by the same kind of right that Robinson Crusoe had to the sovereignty of his island,) arrived at Plymouth, as usual about 11 o'clock, the night of my arrival there, and in a few minutes was again on her return voyage. The next morning at 10 o'clock, I reached the landing at the Portsmouth and Roanoke railway, expecting, as formerly, to be able to reach Petersburg by way of North Carolina, the evening of the same day. But this convenient and speedy, though circuitous course of travel, had been interrupted by a new arrangement of the mails, (and derangement of travelling,) and I had to choose between waiting for the next train some 18 hours, where there was neither accommodation

nor any other gratification, or to consume the interval by keeping with the steam train in its course to Portsmouth, to return again with the next; which was done. Thus to travel 80 miles out of one's course, without losing time by it, is one of the strange things attending the present rapid mode of travelling, and its interruption on cross routes. This delay gave me an opportunity of spending from 2 to 11 P. M., in Portsmouth and Norfolk, and of viewing some of the (to me) interesting subjects of the following notes.

Silk culture in operation and preparation.

Who could have anticipated, even as late as two years ago, that this heading would be suitable for any notes of observations made in Virginia? Yet it is so now; and I feel confident that, before this present season expires, so many and such successful operations will have been completed, as to leave no room for the experimenters to doubt, and which will serve to establish silk-culture among the regular and profitable directions of labor and capital in the southern states.

The authorities of the Alms-house of Norfolk have done honor to themselves, and furnished a profit, and rendered a distinguished service to the institution they govern, and to their country, by introducing silk culture, upon an extensive scale. Mr. Duesberry, the intelligent and zealous superintendent, has either ready fitted up, or in progress, the upper floor of the Alms-house. He has now feeding, in various stages of growth, half a million of silk-worms, and intends to feed as many more, during the season, as will make four millions in all. Mr. D. is less a novice than most other experimenters in Virginia, he having fed silk-worms on a small scale for the three preceding seasons. The oldest of his worms (the eggs of which had been prematurely hatched by March 12th) had begun to spin on April 24th, and by the evening of the next day, when I saw them, the cocoons seemed completed in outward appearance and in firmness, so that I could bring away a few as specimens of such unusually early product. A fire had been kept in the fire-place of the room generally, until within a few days previous, when the weather became warm. The oldest worms, doubtless, were somewhat injured by such early hatching, and the consequent exposure to cold, and even want of food; but had on the whole done well, and were forming fine cocoons. The greater number, hatched later, were in the best possible condition.

I was surprised as well as highly gratified to learn from Mr. Duesberry that the preparations already made, or in progress towards sure completion, for feeding silk-worms this season, were so extensive. He named the sundry individuals who are about commencing the business in the environs of Norfolk and Portsmouth, and the number of worms that each counted on feeding. There will be at least a dozen proprietors so engaged, and who expected to feed collectively more than twenty millions of worms this season. It is true that this is *yet to be done*; and therefore I shall not make statements at greater length as to mere intentions. But there is no doubt that a business to this amount will be undertaken, and I hope to be enabled to state results, and successful and profitable results, of what now is but preparation

and promise. Norfolk county, though having natural agricultural advantages which few other regions can compare with, has heretofore been the most sluggish in the march of agricultural improvement. But this county is now decidedly ahead of all the south in the silk-business; and I trust that energy and success in that will produce the energy which will certainly lead to success in the exercise of all its great and neglected means for improvement and agricultural wealth.

In North Carolina, though I met with but few cases of regular silk-culture either in operation or preparation, I heard of sundry, and some on a very large scale, at places not in my route; and I witnessed several striking proofs of the admirable fitness of the climate to enable the worms to endure privations and rough treatment. At Wilmington, in Dr. McRee's garden, I saw silk-worms feeding on *morus multicaulis* bushes in the open air, and apparently as healthy and vigorous as if sheltered and well cared for. The eggs, in a hatching state, had been merely placed on the bushes, and nothing more done to save them. A few of the oldest were in their fifth age, and had endured one snow (on March 25th) and all the rains, one of which occurred on April 15, the evening before I last saw them, and was very heavy. The hatching having been very unequal, most of the worms were much less advanced than the most forward. Doubtless most of them had perished, and perhaps all then remaining will perish, before attaining full growth, by the depredations of birds and ants. But still, the good condition of those which remained when I saw them, after such early and long exposure, was a very satisfactory evidence of the climate being altogether as kindly as if *natural* to silk-worms.

In Newbern, several persons were feeding very successfully, but mostly on a small scale. The largest operator was Mr. W. R. Street, the keeper of the hotel where I lodged, whose establishment I visited. He had feeding, as he supposed, 200,000 worms, in an old dilapidated frame building, which had no glass or close windows, but plank shutters on hinges instead, and was more open to outer air, and to cold and dampness, than any house I ever saw used for the purpose. Two negro women were the feeders, with very slight superintendence from Mr. Street, in short visits two or three times a day. There had been fires kindled on three of the coldest days only. The progress of the worms had been slow, owing to so much cold weather; but they appeared to be doing well, and to have suffered from nothing except too much care, or illy directed care, from their feeders. I learned from my inspection, and a free conversation with the two feeders, to be much more confident than I had been as to trusting the details of the business to such ignorant as well as inexperienced operators as we must now find in our negroes.

At 11 P. M. (25th) I left Portsmouth by the return train, and reached the junction of the railroads (78 miles) to early breakfast next morning. There I had again to wait through a tedious day for the next train to Petersburg, which started at 8 P. M. and reached Petersburg after midnight.*

* The letter of J. W. Bryan, esq., spoken of in the foregoing article, as to follow, though in type, is compelled to be postponed, for want of space for its insertion. It will appear in the next number.—ED. F. R.

MR. RONALDSON'S SEEDS.

We lately received from James Ronaldson, esq. of Philadelphia, a quantity of sugar beet and other garden seeds of various kinds, imported by him from France, with the request that they should be distributed gratuitously to such cultivators as would take care of the products, and report to us for publication any results deserving such attention. The object of the public-spirited donor has been very imperfectly secured, though as well as circumstances permitted. The lateness of the season leaving very little time for choice, or delay, compelled us to make a very hasty distribution, and much more confined in extent than would otherwise have been attempted. As to Mr. Ronaldson's condition, or request, of reports for publication, we did not pretend to make it imperative; knowing, by long experience of our countrymen's aversion to writing, that such a requisition would either have prevented the acceptance, or otherwise would have produced a larger crop of broken promises than of any other products from the gifts. We however here repeat the request; and hope that by it Mr. Ronaldson may be more successful in eliciting reports of these particular experiments and results, than we have been, or can now hope to be, for the general objects of the Farmers' Register.—ED. FAR. REG.

QUANTITY AND VALUE OF THE EXPORTS OF THE COUNTY OF ACCOMAC.

To the Editor of the Farmers' Register.

I subjoin for publication, if you shall think it of sufficient interest to deserve it, a statement that has been prepared with great care, exhibiting the quantity and value of the produce exported from the county of Accomac, in this state, for the crop of the year 1838. The year 1838 was not selected as furnishing a larger amount of exports than ordinary years; but as the inquiries were commenced last year, it was more convenient and more favorable to accuracy in the results, that they should have reference particularly to the year immediately preceding. The crop of 1838 was about an average one as to quantity in Accomac, and the prices did not exceed the average of several previous years. The results exhibited in this statement were obtained by personal application to every exporter of grain in the county, who furnished to the gentleman who prepared it, minute and accurate accounts, taken from their books, of the kind and quantity of their exports for the year 1838. So that, although it cannot be pretended that the account is precisely accurate, it seems not to be going too far to say that it approximates much more nearly to the truth than statistical statements generally do. And I will add that the statement was prepared by a gentleman well known throughout the state for his diligence and accuracy in statistical inquiries.

The prices at which the value of the produce is estimated in the subjoined statement are not those for which the articles sold in the market, but the net prices received by the farmer; and it is believed they fall rather short of the average prices of that year.

Statement.

Oats, 350,000 bushels at 40 cents, -	\$140,000
Indian corn, 250,000 bushels, at 85 -	212,500
Sundries, viz.: wheat, sweet potatoes, peach brandy, dried peaches, flaxseed, peas, beans, steamboat wood, &c. at least, - - - -	47,500
Total, - - - - -	400,000

Your readers upon the other side of the water, who seem to regard our peninsula as little better than a "barren sand beach," will probably be astonished to see that the surplus crop of the county of Accomac alone, for one year, amounted to the handsome sum exhibited in the above statement.

And to this I will add, that the rate of rents on the Eastern Shore is perhaps higher than any where else in the state; a circumstance which indicates, of course, the great prosperity of the agricultural interest. One half of all the crops of every description is the usual proportion for land of good quality, and in several instances within the knowledge of the writer, the tenant gives one half, without a house of any sort, and without the privilege of fire-wood. For land below the average quality, two-fifths of all the crops, or two-fifths of the corn, and a half of the oats, and either two-fifths or a half of all the other crops is the usual proportion. The price of land is, of course, high in a corresponding degree.

AN EASTERN SHORE MAN.

Accomac C. H., April, 1840.

CULTURE OF INDIAN CORN.

From the Cultivator.

Messrs. Editors—Careful observation has satisfied the writer, that the present system of cultivating Indian corn, is generally very defective, and can be greatly improved. Not more than half a crop is obtained upon an average, except on new or very strong land. We also see this valuable crop frequently destroyed by autumnal frosts.

The following is an outline of the plan which has been tried by the writer, with entire success. Good crops have been obtained—75 bushels to the acre—and the corn invariably ripened before the frosts of autumn could injure it.

Spread upon the ground, before ploughing, 20 to 30 ox cart loads of good, long, or unrotted stable manure; when the corn is planted, put into the hill one half of a shovel full of well rotted manure. This will give the corn an early and vigorous growth, until the roots are long enough to derive sustenance from the long manure. By thus giving it an early start, it will ripen two or three weeks earlier than it otherwise would. The long manure will carry it out, and make more corn and less stalk, than when all rotten manure is used. Let the manure, which is to be kept until it has rotted, be piled up, and covered, so as to

protect it from rain and sun, and it will lose much less of its strength than if exposed. Some may say, that the quantity recommended per acre, is more than can generally be afforded. Unless the land is very strong, or in high tilth, *less can not be afforded*. As a general rule, 5 acres, with 100 loads of manure, will produce more corn than 10 acres with the same quantity, besides the great saving of labor and ground. It is very clear that farmers generally do not manure their land high enough for Indian corn. Upon sward land, rotten manure is indispensable to give the corn a start, and insure an early and full crop.

Poudrette is a good substitute for rotten manure when it can be had.

No farmer should be satisfied until his average crop is at least 75 bushels to the acre.

A LOVER OF GOOD HUSBANDRY.

New-York, March, 1840.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

There has been nothing particularly worthy of note in the commercial operations of the month, and no material variation in the prices of domestic produce.

Supplies of tobacco, being in proportion to the increased production, are larger than in previous years, and as the better qualities begin to appear, the range of prices is greater; embracing all rates from \$3 to \$9, and occasionally \$2 or \$3 more for a fancy article. With the exception of two or three cargoes of low quality for the north of Europe, and a small quantity for the south, no foreign exports have been made nor will there be for some

time to come. Indeed foreign markets offer no temptation for shipments before the regular season. The very high rate of freights has retarded shipments from New Orleans, where the stock is rapidly accumulating. Prices there, \$3 to \$7½.

Of cotton, about 1,750,000 bales have been received, which greatly exceeds the supply of any former year to same period, and is 400,000 bales more than the entire receipts of the previous one; leaving little doubt that the enormous quantity of two millions of bales was produced in this country in 1839: an excessive supply, considering the depressed state of manufactures on both sides the Atlantic. Prices range from 5½ to 9 cents in the ports.

The superabundant crops of last year are not confined to tobacco and cotton, but also embrace those of grain. The receipts and exports of flour have been very large; and the great granary of the west is just now about to send forth its ample stores. The price of flour in the Virginia markets is \$4 62 to \$4 75, about the same in Baltimore and Philadelphia, and \$5 12 to \$5 50 in New York. Large shipments have been made to Europe, particularly to England, but the prices there are moderate, considering the reported deficiency of their last crop.

Indian corn is worth 45 to 50 cents per bushel.

The rates of inland exchange have not improved this month—a difference of about 6 per cent. exists between New York and the southern states; but with some of the western states it is 25 per cent.; and indeed the notes of some of their banks are at 75 or 80 per cent. discount.

The importation of goods from Europe has been unusually small, but has nevertheless exceeded the demand. The spring trade in New York is said to be exceedingly dull.

April 28.

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THE FARMERS' REGISTER.

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MAY 31, 1840.

No. 5.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

THE MARL AND LIMESTONE OF THE BORDERS OF THE NEUSE AND TRENT.

To the Editor of the Farmers' Register.

*Egypt, Craven county, N. C.
March 24, 1840.*

It was a matter of regret to us that you were unable to visit our section of the state, [in November,] whilst on your "jotting" expedition; but we are much consoled by the reflection that you have not abandoned your intention of so doing. Your trip might be made more interesting to you, to say nothing of the additional facilities and comforts the route would afford you, by taking the Wilmington rail-road to Waynesborough, on the Neuse river. In the vicinity of Waynesborough, you might be gratified by visiting and viewing the limestone formations of the Sarponey hills, which are thus described by Professor Olmsted, in his Geological Report:

"In the eastern part of the county of Wayne is a high ridge of land, extending along the south side of the river, (Neuse,) for several miles, and dividing the waters of this river from those which pursue a longer course to the Cape Fear. These hills are covered with large blocks of a fine stone marl, beneath which, at the bed of the river, lies a formation of limestone, of the description called by mineralogists *oolitic limestone*—different in its appearance from all the other beds which occur on this river. The most favorable view of these rocks occurs at Mr. Griswold's, on the bank of the river, nine miles below Waynesborough, where a bluff, ninety feet high, exposes them fully to inspection. Thirty-five feet above the limestone, in the side of the hill, the blocks of marl above mentioned made their appearance. It is of a close texture, nearly or quite destitute of shells and other organic remains, and does not, like the stone marl further down, fall to pieces on exposure to the weather. It is of a lively gray color, and when first removed from the bed it is so soft as to be easily cut with a knife, or sawed into blocks; but on becoming quite dry it grows hard and firm, and assumes every appearance of a most elegant building stone. Indeed, on comparing it with a specimen of the celebrated Bath stone (which is used for the finest public buildings of the city of London) recently taken from Westminster Abbey by the Rev. Dr. Caldwell, (the late lamented president of the University of North Carolina,) the eye can hardly discern any difference between them, but the two appear equally well fitted in texture, color and beauty, for the finest purposes of architecture. It is composed of sixty per cent. of lime and forty of a fine gray clay. It is therefore a true marl." This country abounds in all the *material*, for becoming a rich agricultural section, although the lands naturally are not rich, and possesses likewise the great desideratum of being healthy. As you progress lower down the Neuse, seven miles below Waynesborough, *by land*, you encounter the beginning of a most extensive and singular deposit of copperas, which extends along the Neuse for more than one hundred miles—these forma-

tions are so very extensive on the banks of the Neuse river, that if necessity should ever compel our citizens to the manufacture of this article, here are deposits sufficient not only for home consumption, but for very great exportation. You will find all along the banks of the river evidences of limestone formations until you reach the plantation lately owned by Isaac Croom, esq., in Lenoir county, where there are some very rich and valuable deposits of marl. These beds are of extensive formation and have been sold at one hundred and twenty-five dollars per acre, a sum far below their value, to their present owners, if they are ever applied to their lands—they lie immediately on the banks of the river, are of easy access, and the marl can be boated at little expense. Mr. John C. Washington, of Vernon, near Kinston, in Lenoir county, has purchased an acre of this formation, and intends to transport marl down the river in boats some six or seven miles, and then haul it in carts to his farm. You will recollect that specimens of this marl were submitted to your inspection and analysis, and that the lower bed contains $\frac{42}{100}$ of carbonate of lime, and the upper one $\frac{55}{100}$. Descending the river about twenty-five miles, you will meet with a most extensive and interesting formation of marl at Fort Barnwell, the residence of Col. Samuel S. Biddle; in fact, all of his lands lying along the river are more or less impregnated with lime, and it is a singular fact, that whilst the lands of nearly all of the old settlements in this section of the country, are almost worn out and perfectly impoverished, these limestone lands still retain their heart and strength. Col. Biddle has made but limited applications of marl to his lands, but is turning his attention to this interesting subject, and I trust ere long will give you the results of his experience and observation. Adjoining the farm of Col. Biddle is my own. I have lately, in my largest field, opened a pit of marl, which has all the appearances of being extremely rich, and of almost boundless extent. The formation consists of a vast collection of scallops, oysters, conchs, corals and madrepores, all blended together in minute particles, except now and then you may obtain specimens of entire shells of each description. I have sent to our university some very interesting specimens of shelly and organic remains taken from this pit, and hope thereby to elicit much valuable information in relation to them and their *genealogy*. From several indications about this pit, I have been induced to believe, that with the proper apparatus for boring, I could soon obtain salt water, which, if it yielded a brine of half the strength of the New York salt wells, would be of great value. The well at Liverpool in New York, is eighty-two feet deep, (only,) and contains the strongest brine in the state, as 40.5 gallons yield a bushel of salt. Dr. Beck has given the strata found in digging this well: "Shell marl twelve feet, fine sand fourteen feet, very fine grayish clay forty-three feet, below this, a deep bed of gravel, in which the brine began to appear, and soon rose to near the surface."

I have not excavated to the extent here spoken of by Dr. Beck, but as far as I have progressed, the indicia seem to be the same as indicated in his report. And why should there not be salt water found? We are not more than fifty miles in a direct line from the ocean, this "low country" has almost a uniform level from the sea, with no great elevation above its high tides, and the deposits here found, are all of a marine character. But I will not pursue this inquiry further, until I have made some further investigations, which I contemplate making. Upon leaving Egypt, on your way to Newbern, you will find, every now and then, on the river, appearances of lime and marl, until you reach the plantation of Isaac Taylor, esq., about three miles from Newbern. Mr. Taylor is one of our best practical farmers, and has turned these limestone formations on his lands to good account, as is best evidenced both by the appearance of his crops and quantity of corn and cotton produced from them. His plantation, however, possesses advantages which but few others enjoy. In front of his farm, on the river, there are extensive flats or marshes, which produce an inexhaustible supply of coarse grass, which is here used for hay, being cut and cured as the other grasses which are converted into hay. Our horses and cattle are very fond of it, and large quantities are cut and sold in the town of Newbern for winter forage from the marshes, in the vicinity of the town. This, with the lime, affords an abundance of manure, particularly when taken from the stables, &c., after it has been pulled to pieces and trodden down by the stock. Four miles and a half from Newbern, at Johnson's Point on the Neuse, about five feet above low water mark, these beds of shell marl again make their appearance. Here is an inexhaustible quantity of marl, lying in its native beds perfectly undisturbed, and for all practical purposes utterly useless, although the access to it is as easy as nature could make it. The lands too on Brice's creek, and the surrounding country, would be prodigiously benefited by an application of this marl, being entirely made up as it is of marine substances, among which are scallops, oysters, clams, conchs, corals and madrepores. The expense of excavation and removal from this place to the farms in the vicinity could not be very great, as the water facilities are as good as they could be desired. Ascending the Trent river, one of the prettiest streams in our country, you pass through a district of land which affords some of the finest farms in our state; about three miles from Newbern, you will come to the farm of George Wilson, esq., one of our most scientific farmers. Mr. W. has contributed largely to our agricultural knowledge, and is an able contributor to many of our best agricultural periodicals. Here you will find an abundance of limestone yielding a very large per cent. of carbonate of lime. Mr. W. converted this stone into lime by burning it in furnaces, and has sold much of it in market. The beautiful episcopal church in Newbern is built with lime from Mr. Wilson's furnaces. The Trent river is very rich in limestone formations, nearly all the way up, and at Mr. Hargeth's, three or four miles above the farm of Mr. Wilson, you will obtain a full view of the limestone where the rock has been quarried for use. As this singular and abundant formation will, no doubt, in time to

come, constitute the gold mines of this section of the country, I will give you Professor Olmsted's description of it, as received and examined by him. "It makes its appearance on the left bank of the river near its bed, and fifteen feet below the surface of the ground. It has been traced a mile up and down the river, and extends to an unknown depth, lying in horizontal masses. This limestone consists almost entirely of small convex concretions, irregularly aggregated, and forming numerous cavities. The peculiar forms of these concretions make them resemble the moulds of shells, no longer preserving their organic character, but now united with silex into a rock. The cavities contain more or less water which holds a portion of the lime suspended, so that there exudes from the rock when first removed from its bed, a liquid resembling milk. The color of the stone, when first quarried, is a bluish green, and its hardness is not much greater than that of ordinary limestone; but on exposure to the air, it becomes brown, and hard enough to fire with steel. It is in fact a natural mortar, composed of about three parts lime and one sand, with a little iron. To its union with this sand, and to its entire freedom from clay, is to be ascribed its property of acquiring such remarkable hardness. The principal use of this limestone at present, is for mill-stones, particularly such as are wrought by hand, or hand mill-stones, which are in common use in the neighboring country. A pair of these is furnished at three dollars. The large kind, or water mill-stones, bring forty or fifty dollars." Six or seven miles further, upon Mill Creek, a tributary of the Trent, is found the most singular deposit of oyster shells that occurs in any part of the world; they are really of the mammoth genus, and are found in extensive beds. Professor Olmsted saw and obtained many of these shells measuring a foot and more in length, and of correspondent width. Many of these shells, upon being exposed to the air, crumble and decompose, and form a rich deposit of lime. J. Collinson Burgwyn, Esq., of Green Hill, in Jones county, whose farm lies upon the Trent and this creek, in the course of the last year caused quantities of these shells, which are found also in great abundance on the river, to be dug up and spread on his fields, the worth of which he will ascertain from his coming crop. It is to be hoped from Mr. Burgwyn's known devotion to the science of agriculture, that a fair experiment will now be made, in testing the value of these organic remains, and that we shall be favored with the practical results of his experiment. A little farther up, another singular formation of shell marl occurs on the plantation of Joseph Whitty, Esq., differing in its location from other similar deposits, as here it breaks out "on the borders of one of those remarkable swamps called *pocosons*." I do not know that Mr. Whitty has made any use of this rich deposit on his land, for in fact although this section of country affords such inexhaustible resources of this kind, but few of our planters have yet obtained their own consent to abandon even in a measure the old fashioned way of manuring, and to try an experiment on a small scale. It was on this plantation whilst it belonged to Durant Hatch, sen., that a most interesting discovery was made in digging a well, which is well authenticated, and which we have often heard Gen. Hatch speak of

in his lifetime. After the diggers had progressed between fifteen and twenty feet into the earth, they came to the head of an Indian cypress canoe, which had been tied to a cypress knee with a rope—the rope when exposed to the air, crumbled and fell down into a fine pulverized substance like ashes. Gen. Hatch had the head of the canoe cut off and kept it many years as a curiosity. As Buffon seems to think that this continent was formed by the rotatory motion given to the sands, &c., by the ocean around some mountain, &c., and was gradually enlarged, &c., here is a well established fact, which would give employment to some antiquary for years, particularly when connected with the marine and organic remains which surround it. At Mr. Becton's, in the north-western part of this county, there occurs "a deposit of a hard, dark-colored limestone, containing small oyster shells imbedded together with an abundance of sharks' teeth, sometimes penetrating the rock, and sometimes scattered loosely among the seams." This is a very pure limestone, containing ninety-three per cent. of lime, and extends into Lenoir county, and may be traced to the farm of Col. Blount Coleman, in that county, where it appears in very great abundance. I neglected to mention a formation of stone marl near Mr. Becton's, of the richest kind yet discovered in this country; but as I have, I fear, wearied you with this dull detail of our internal agricultural resources, I will not trouble you with any further descriptions of them. Enough has been said, I trust, to induce you to come among us, for if there be any country that affords a rich and boundless field for investigation, &c., it is ours—and we venture to affirm, that not one can be found where the lavish gifts of nature have been so shamefully neglected and rejected.

Respectfully yours,

JAMES W. BRYAN.

CULTURE OF THE POTATO.

From the Cultivator.

By common consent the potato has been placed at the head of all the edible roots, wherever it has been introduced, and the climate would admit of its cultivation. Originating from an obscure and worthless root among the Cordilleras of South America, in spite of prejudice and opposition, it has spread with a rapidity unknown to any other vegetable, and is doubtless destined to make the circuit of the globe, adding in an incalculable degree to the means of subsistence. There are few if any vegetables grown in the temperate zone that yield so great an amount of food per acre as the potato. Wheat, according to Sir H. Davy, contains 950 parts of nutritious matter in 1000; and the potato 250; but when it is remembered that the yield of the potato on an average is from ten to fifteen times as much per acre as wheat, the advantage in favor of the potato is manifest. Besides such is the human organization that pure nutritive matter is injurious to its healthy functions, and the stomach requires to be more or less distended with other matter before the excitement necessary to nutrition takes place. We are, therefore, justified in supposing that good potatoes used exclusively as an article of food,

would be less injurious than pure wheat flour. Be this as it may, the potato in most civilized countries now ranks next as an article of food to the rice of the tropics; and the wheat and maize of the more temperate regions. To Europe is America indebted for the graminæ, and had we returned them nothing more than the potato and maize, the debt must have been considered as cancelled.

The potato is usually propagated by the tubers or roots, but new varieties are obtained or old ones that have partially degenerated restored, by cultivating them from seed. There are few plants that show more decisively the improvement that may be made by cultivation than the potato. In 1838, a quantity of the original roots were brought from South America to England, and carefully planted. The result was a small inferior root, more resembling the ground nut than the potato, and not widely differing in appearance from those of the first year's growth from seeds. There is an idea prevalent among many farmers that potatoes are mixed, or what by the breeder of animals would be called crossed, by having several kinds planted in the vicinity of each other. This is an erroneous opinion. The crossing takes place in the flowers or seeds and not in the roots; and hence there is the same uncertainty that the seeds of any given variety of this root will produce potatoes of the parent kind, that there is that the apple seeds will give apples like those from which they are taken, a thing of very rare occurrence.

Every farmer who has paid attention to the manner of growth in the potato is aware that the tubers are not produced from the roots proper, these being, as in other plants, used solely for the purpose of nutrition, but on shoots thrown out above these, and nearer the surface of the earth. It was the opinion of Decaudolle that by repeated coverings of the stem such shoots, and of course potatoes could be produced the whole length of the stalk, and some experiments that he made seemed to favor such a supposition; still we must be permitted to say, that having in part repeated his experiments, we have found nothing to justify the opinion that such a result would be effected by this treatment of the stem.

The propriety of cutting the tubers or planting them whole has been much discussed, and the multitude of experiments on record would seem to show by their conflicting results, that at least as much is depending on other circumstances, as on the root being planted in a whole or cut state. If an acre of ground be planted in hills or drills with whole potatoes, and another acre be planted with sets or cuttings at equal distances with the other, the experiments made by the London Horticultural Society would go to prove that the acre planted with whole potatoes would yield the most, but not much if any more than the additional quantity of seed required in planting. If whole potatoes are used, from twenty-five to thirty bushels will be used; if cut, not more than half that quantity will be required. In both cases, however, much will be depending on the size of the whole potatoes, and the number of eyes in those cut. The distance between the rows must be determined by the length of stem produced by the potato, and the several varieties vary much in this respect.

In cultivating the potato a climate rather cool

and moist is found most preferable to any other. Of course the root succeeds much better in the northern states and in the adjoining British provinces than in the southern parts of our country. In the north, parts of Maine and New-Hampshire, and the Province of New-Brunswick are celebrated for the excellence of their potatoes. In New-York, the tract lying east of Lake Ontario, between that and the Mohawk and Black rivers, produces good potatoes; and the elevated lands in the south of New-York and the north of Pennsylvania are noted not only for the quality of their potatoes but the large crops they annually produce. The potato will succeed well on almost any kind of land provided it is rich, and is not wet and clayey; but for this, as for most other crops a friable loam of sufficient consistence to prevent drought will be found superior to any other. Swamps containing large quantities of vegetable matter, when sufficiently drained, have produced great crops, and what in new countries is termed muck land, is also favorable to their growth. Two things in a potato soil seem to be indispensable; it must be rich, or a crop cannot be expected; and it must be sufficiently loose to allow the shoots that form the tubers to spread and enlarge freely. In Europe the British islands are justly famed for their root culture, and the introduction of the potato into Ireland has enabled that country to double its population; if it has not banished want and distress, these evils are not of as frequent recurrence now as formerly, notwithstanding the increase of consumers. Cobbett, indeed, charged upon the potato all the evils of Ireland; and Dr. Tissot has demonstrated to his own satisfaction, that no potato-eating nation has ever produced a great man.

The greatest crops of potatoes on record are those grown by General Barnum of Vermont, which reached from 1,500 to 1,800 bushels per acre; and he gives it as his opinion, that in a good soil, and with his mode of culture, from 800 to 1000 bushels per acre may be safely calculated upon. The reports of the agricultural societies of our country show that from 500 to 700 bushels per acre are not uncommon. Mr. Bache, of Wellsborough, Pa. in 1839, raised 600 bushels to the acre, and the crop of Mr. Morris, of Cattaraugus, in this state, fell but little short. The average crop in the country cannot we think be estimated at more than from 175 to 250 bushels, the influence of the seasons being more felt on this crop than many others.

The methods of planting are various. Gen. Barnum's mode, after a careful and thorough preparation of his land, is to plant in drills 22 inches apart, and the sets in the drills 10 inches from each other. The drills are kept clean, but the earth is hilled around the plants only once in the season; as he considers there is much danger of disturbing the young tubers by removing the earth or causing the formation of new shoots for tubers by repeated hoeings or hillings. The secret of his great crops appears to consist in his bringing rich fresh earths, the scraping of the ditches or streets, or earth from the barn-yard, or the mould deposited in swamps, and giving each hill a shovel full, as a top dressing. He does this with the aid of a horse and cart, the horse and the wheels passing between the rows.

We have seen very good potatoes grown by

simply dropping the seed on a clean turf, and spreading over them a covering of straw six or eight inches in thickness. The straw must be evenly placed, and if moved by the wind before it gets settled together, which it will soon do, it must be carefully replaced. This covering of straw keeps the surface moist, the grass can not spring up through it, and in the fall the potatoes are found on the surface of the turf, and perfectly clean when the straw is removed. The danger in this mode of planting would seem to lie in a dry season which is frequently fatal to the crop; and a heavy crop is rarely in this way produced.

In the Monthly Visitor, for February, 1840, is an account of an experiment with potatoes, which was eminently successful, and deserving of notice. In the spring of 1839, Mr. Whitney of Crafisbury Vt. "broke up a piece of green sward, harrowed it thoroughly, carried upon it manure from the yard at the rate of 32 loads to the acre, cross ploughed it, harrowed it again, and planted it in the usual manner in hills. At the proper ploughing between the rows, the piece was well hoed, and at the proper time was repeated. In the fall he dug from this piece at the rate of 300 bushels to the acre, which for this year, on account of the rust, was considered a good yield. By the side of this piece, on precisely the same quality of soil, manure was carted and spread at the rate of 32 loads to the acre; the sward was then carefully turned over, and the furrows laid flat with a roller. Between every other furrow, where they came together, (that is between the first and second, and between the third and fourth and so on,) holes two feet apart were made with a sharpened stick, about three inches deep, large enough to receive the seed. Into each hole one piece of potato was put, and the holes filled up with mellow soil, even with the general surface of the field. There was no further labor bestowed upon the crop till the digging, when the quantity produced was a little over 400 bushels per acre. Although never hoed not a weed was seen in it. Before digging, the field had the appearance of having been well hoed, the potatoes having raised up the ground above them."

The Rohan potato is an instance of the fortunate production of a new and valuable variety from seeds. This root which, wherever it has been tried in our country, seems to have satisfied all reasonable expectations that had been formed, is destined doubtless to add much to the value of the potato crop: and no good reason can be given why other, and still more productive kinds may not be produced by the same methods. A comparison of a crop of Rohans with one of the original wild potato, would seem to justify expectations of still further improvement, from the combined agencies of cultivation and reproduction from the true seeds.

In all cases the value of early potatoes is great; and particularly so in the vicinity of cities, where a constant demand, and ready market for such vegetables always exists. Experience has taught the growers of potatoes for the London market that ripe potatoes can be found from ten to fourteen days earlier in hills or drills planted with sets from the top end (the one that has the most eyes) than in those planted from the root end of the tuber. The Lancashire gardeners therefore assort their sets, so as to have them ripen at the same time,

and thus obtain roots for market sooner than they otherwise could do. It is probable that quite an improvement might in this country be effected in the same way.

DIONÆA MUSCIPULA.

From "Curtis' Enumeration of Plants around Wilmington, North Carolina."

This plant is found as far north as Newbern, N. C. and from the mouth of Cape Fear river nearly to Fayetteville. Elliot says, on the authority of Gen. Pinckney, that it grows along the lower branches of the Santee in S. Carolina. Dr. Bachman has received it from Georgetown, S. C.; and Mr. Audubon informed me, with the plant before us, that he has seen it in Florida of enormous size. I think it not improbable, therefore, that it inhabits the savannas, more or less abundantly, from the latter place to Newbern. It is found in great abundance for many miles around Wilmington, in every direction. I venture a short notice of this interesting plant, as I am not aware that any popular description of it has been published in this country.

The leaf, which is the only curious part, springs from the root, spreading upon the ground, or at a little elevation above it. It is composed of a petiole or stem with broad margins, like the leaf of the orange tree, two to four inches long, which at the end suddenly expands into a thick and somewhat rigid leaf; the two sides of which are semi-circular, about two thirds of an inch across, and fringed around their edges with somewhat rigid cilia or long hairs like eyelashes. It is very aptly compared to two upper eyelids joined at their bases. Each side of the leaf is a little concave on the inner side, where are placed three delicate, hairlike organs, in such an order, that an insect can hardly traverse it, without interfering with one of them, when the two sides suddenly collapse and enclose the prey with a force surpassing an insect's efforts to escape. The fringe or hairs of the opposite sides of the leaf interlace, like the fingers of the two hands clasped together. The sensitiveness resides only in these hairlike processes on the inside, as the leaf may be touched or pressed in any other part, without sensible effects. The little prisoner is not crushed and suddenly destroyed, as is sometimes supposed, for I have liberated captive flies and spiders, which sped away as fast as fear or joy could hasten them. At other times I have found them enveloped in a fluid of a mucilaginous consistence, which seems to act as a solvent, the insects being more or less consumed in it. This circumstance has suggested the possibility of their being made subservient to the nourishment of the plant through an apparatus of absorbent vessels in the leaves. But as I have not examined sufficiently to pronounce on the universality of this result, it will require further observation and experiment on the spot, to ascertain its nature and importance. It is not to be supposed, however, that such food is necessary to the existence of the plant, but like compost, may increase its growth and vigor. But however obscure and uncertain may be the final purpose of such a singular organization, if it were a problem to construct a plant with reference to

entrapping insects, I cannot conceive of a form and organization better adapted to secure that end than are found in the *dionæa muscipula*. I therefore deem it no credulous inference, that its leaves are constructed for that specific object, whether insects subserve the purpose of nourishment to the plant or not. It is no objection to this view that they are subject to blind accident, and sometimes close upon straws as well as insects. It would be a curious vegetable indeed, that had a faculty of distinguishing bodies, and recoiled at the touch of one, while it quietly submitted to violence from another. Such capricious sensitiveness is not a property of the vegetable kingdom. The spider's net is spread to ensnare flies, yet it catches whatever falls upon it; and the ant lion is roused from his hiding place by the fall of a pebble; so much are insects, also, subject to the blindness of accident. Therefore the web of the one, and the pitfall of the other, are not designed to catch insects! Nor is it in point to refer to other plants of entirely different structure and habit which sometimes entangle and imprison insects. As well might we reason against a spider's web, because a fly is drowned in a honey pot; or against a steel trap because some poor animal has lost its life in a cider barrel.

DURHAMS VS. DEVONSHIRES.

From the Cultivator.

Messrs. Editors—Permit a subscriber to make a remark or two on an article in your December number, recommending Devonshire cattle in preference to the Durham. I would first observe that the recommendation comes under no responsible signature; the assumed one of "*Phelim*," is no guaranty for the good faith, disinterestedness or soundness of the advice, and in a matter of such importance, the incurring the vast expense of changing one high priced breed for another, we should at least know in whose judgment and experience we are asked to confide. In general it would heighten the character of your publication, if all your correspondents were required to give their names with their communications, but more especially where facts are stated or advice volunteered.

Phelim informs us, that among northern farmers, the Durham cattle are considered "not adapted to the climate, the pasture not sweet or rich enough, and the winters too cold or severe." He then asks "whether it would not be a good plan to buy some other breed that will keep on short pasture and stand our severe winters?" Admitting his premises, the answer to this inquiry would undoubtedly be in the affirmative; but it seems to me that in pitching upon the Devonshires as a substitute, he could not have made a worse choice among all the known breeds of improved cattle. I will admit that the latter being a lighter breed may exist on shorter commons, but why does he expect them to possess more hardiness than the Durhams? Is it because his favorites derive their origin from the mild relaxing climate of Devonshire, where myrtles and oranges endure, almost without protection, what can hardly be called a winter, while their rivals from their birth are accustomed in their native county, Durham, to face the blasts of the frozen North Sea, or has any

legerdemain (we know the arts of cattle breeders are wonderful,) transformed the delicate constitution of the Devons into something like that of the Arctic bear?

In other respects Phelim has not given an exaggerated description of this celebrated stock, but I must have better evidence than unsupported assertion before I can believe that they excel the Durhams in ruggedness of constitution. In our southern states, tho Devons would probably find a congenial climate, while the improved Durhams, mingling the blood of the Flemish and native British races, have all the predisposition that descent can give to make them hardy, and to fit them for our own rigorous seasons. In evidence of this, we see them extending themselves even into the Scottish territory, whilst the other (Devons) are never attempted. If a change becomes necessary, would it not be better to take them from a more northern than a more southern district. With this view, I do not *recommend*, but I venture to direct public attention to the far-famed Ayrshire breed, as possessing all the qualities Phelim presumes the Devons to possess, except, perhaps, their peculiar fitness for the draught, while they are altogether superior as a dairy stock. I do not surrender the Durhams, however, where they are not stunted in their summer pasturage or starved during winter upon straw, and the following instance will show that they rank high as draught cattle; a pair of Durham steers raised by the late Mr. Brentnall of Goshen, have in one day gone from that village to the Landing at Cornwall, a distance of about 20 miles, and returned the same day with a load!

One point of conceded superiority the Durhams possess which has not been touched upon; that of early maturity. Phelim confesses that the cows of the Devonshire stock are smaller than the bull; this is a disadvantage, and hence their calves, as far as my experience goes, are small, puny and of slow growth, requiring at least one year more than the Durhams before they are fit to breed.

RECEIPT FOR DESTROYING CATERPILLARS, USED BY THE SOCIETY OF CHRISTIANS CALLED SHAKERS, AT CANTERRURY, N. H.

From the New England Farmer.

"Take equal parts of spirits of turpentine and train oil; apply them by means of a swab fixed on a pole, commence the operation in the spring, (we suppose on the first appearance of nests) when these devouring insects begin to appear, and repeat the operation once a week, till the trees are in blow, and very few will escape with their lives."

Signed F. W.

The head of the family.

We must express our admiration of this receipt, not because of its novelty, for either of the ingredients would be quite sufficient to kill the insects, as will common soap suds from every Monday's wash, *most thoroughly*, without train oil or spirits of turpentine; but we admire it, as a specimen of the practice and industry of those citizens. If our farmers would only follow *that part* of the receipt, which requires a *weekly attention*, for three successive weeks, it is immaterial whether they use spirits of turpentine or train oil, or soap suds, or

the brush proposed by Col. Pickering, the evil would be cured at any rate. The great difficulty is the neglect to do *any thing*, till after the caterpillars have covered the trees with nests. Then the labors of the sluggard commence, and *one tree*, (let this receipt be ever so perfect and powerful) will cost as much time and labor as ten trees would have required three weeks sooner. If our farmers would only adopt *that portion* of the receipt, which requires a weekly attack on this enemy, the evil will soon cease, and in ten years we should scarce see a caterpillar in the country. By this course continually pursued, we have so much reduced the labor, that we have not one fourth part of the number we had three years ago.

APPLES FOR FATTENING GEESSE.

From the Maine Farmer.

Being at a friend's house the other day, in Livermore, he observed to us that his usual supply of material for fattening his geese had been cut off, and he was not able to regulate himself with quite so fat roasters as common on that account.

On inquiring into the subject we found that he had been in the habit of feeding his geese with apples; feeding them out whole, and uncooked, and permitting the fowl to despatch them in their own way and manner. He said that he never made any distinction between sweet and sour, and never perceived that the geese did, as they generally devoured the whole, and fattened remarkably fast upon them.

We presume that if the fruit were cooked it would be better, inasmuch as it could be more easily eaten and digested. We have never had any experience in this mode of feeding and fattening fowl, and if others of our readers have we should be pleased to hear of their success.

ROLLING, A PROTECTION FROM FLY.

From the Farmers' Cabinet.

It is said, that the best protection to very young plants against the fly, or insects that destroy them as soon as they appear above ground, is to roll the surface immediately after sowing, so as to make it as smooth as possible. The plants *vegetate quicker and better*, by having the earth brought in close contact with the seed, and the insects are deprived of shelter, by having the clods broken down smooth. Every farmer should have a small, light roller for his garden, and a large, heavy one for his fields, to be used as occasion may require. And if, in addition to rolling turnip ground, the seed be sown four or five times as thick as would be proper to stand for a crop, then there would be an abundance for the fly to feast upon, and enough left to satisfy the farmer—and if the fly should not thin them sufficiently, cut them out with a hoe, or run a harrow through them, to reduce them to proper distances, to favor their growth.

The advantage of compacting the earth to the seed, is exemplified in planting corn. The corn first makes its appearance where the impression of the foot is, and with more vigor than it does where the soil covers it lightly.

From the Edinburgh Encyclopedia.
AGRICULTURE OF FRANCE.

Before the revolution, agriculture in France was nearly in the same state in which it is still in almost every country in continental Europe. About two-fifths of the land susceptible of cultivation, were in what is termed culture and pasturage, and produced on an average, about one-half of what good culture, on the like quantity of the same soil, would have produced.

If France has been in any respect benefited by the revolution—if she can claim any permanent and general good arising from it as a compensation and atonement for the physical and moral evils she has suffered and afflicted—that benefit and good must be looked for in the state of her landed property, and in the condition of her agricultural population.

Before the revolution, the land in France was held by various tenures, almost all of which were decidedly and extremely unfavorable to agriculture. The manor rents of the clergy have been variously estimated. Condorcet, in his *Life of Turgot*, gives it as his opinion, that the clergy enjoyed near a fifth part of the property of the kingdom. Neckar calculated their revenue at 130,000,000 livres; but it is probable that their manor rents may fairly be estimated to have amounted to about 120,000,000 livres, or 4,800,000*l.* sterling, exclusive of their tithes, which may be rated at about 3,600,000*l.* sterling. The domains of the crown and of the princes of the blood, rented for about 1,200,000*l.* sterling; the feudal and honorary dues paid to the nobility, with *corvées*, militia, &c., amounted at least to 5,000,000*l.* sterling. Besides, the government drew from the produce of agriculture the sum of 8,000,000*l.* sterling. In short, it has been calculated, that, exclusive of the rents of land paid to the lay-proprietors, and of the duties of excise, consumption, and the like, the produce of the soil was charged annually with upwards of 21,000,000*l.* sterling.

But agriculture labored under disadvantages still more discouraging and oppressive, previously to the revolution; to understand and estimate which, it will be proper to consider the different modes of occupying land which then existed, some of which, however, as we shall afterwards see, still remain. In the first place, there were the small properties of the peasants. These were to be found every where to a degree of which we have no conception in England, and which we should not have expected in the midst of the enormous possessions, and the oppressive privileges, of the nobility and the clergy. Even in those provinces where other tenures prevailed, they were to be found; but principally in Languedoc; Quercy, which now forms the department of Lot; the whole district of the Pyrenees, Berne, Gascony, part of Guienne, Alsace, Flanders and Lorraine. The condition of the peasantry, who possessed these small properties, varied much in different parts of the kingdom. In Flanders, Alsace, on the Garonne, and more particularly in Berne, they were in comfortable circumstances, and might rather be called farmers than cottagers; and in Lower Brittany many of them were rich; but this character could by no means be applied to them generally. In fact, the minute division

of property had produced the effects which might be expected from it; and poverty and misery were too visible, especially in Lorraine, and the parts of Champagne which are contiguous to it.

The second mode of possessing land, was by a money rent. This, before the revolution, was the general practice in Picardy, Normandy, part of Flanders, Artois, Isle of France, and Pays de Beauce. It also existed in some of the southern districts of France, particularly in Berne, and about Navareens, a town in the department of the Lower Pyrenees. These tenures were also found in other parts of France, scattered among those which were different and predominant; but, upon a moderate estimate, before the revolution, they did not exist in more than a sixth or a seventh of the kingdom.

Feudal tenures were the third mode of occupying land. They abounded most in Brittany, Limosin, Berry, La Manche, &c., but they were scattered in a greater or less degree through the whole kingdom. These feudal tenures were fiefs granted by the seigneurs of the parishes, under a reservation of fines, quit rents, forfeitures, services, &c. As they formed the most oppressive evil under which agriculture labored previously to the revolution, and from which that event must certainly be allowed the merit of having freed it, it may be proper to notice some of them. Even to enumerate the whole of these oppressions would far exceed our limits; and, indeed, the English language does not supply terms by which many of them can be expressed.

Among the more mild and tolerable of these feudal tenures, may be mentioned the obligation the tenant was under, of grinding his corn at the mills of the seigneur only; of pressing his grapes at his press only; of baking his bread in his oven. The peasantry in Brittany were obliged to beat the water in marshy districts, to keep the frogs silent, in order that the lady of the seigneur, during her lying-in, might not be disturbed by their noise. In short, every petty oppression which could render the lives of the peasantry miserable, or interfere with the operations of agriculture, was authorized by these feudal tenures; though it must be confessed, that, before the revolution, some of the seigneurs, convinced of their injustice as well as impolicy, forebore to exact them. Nor were the oppressions of the feudal tenures the only ones to which agriculture was exposed. There were numerous edicts for preserving the game, which prohibited weeding and hoeing, lest the young partridges should be disturbed; steeping seed, lest it should injure the game; manuring with night soil, lest the flavor of the partridges should be injured, by feeding on the corn so produced; mowing hay before a certain time, so late as to spoil many crops; and taking away the stubble, which would deprive the birds of shelter. These were oppressions, to which all the tenants of land, as well as those who held under feudal tenures, and even the proprietors of land, in many cases, were exposed. The latter, indeed, were dreadfully tormented by what were called the *Capitaines*, which, as affecting them in some measure, as the feudal tenures affected the farmers, may be noticed under this head. By this term was to be understood, the paramountship of certain districts, granted by the king to princes of the blood, by which they were put in possession of the property

of all game, even on lands which did not belong to them, and even on *manors* granted long before to individuals; so that by this paramountship all manorial rights were annihilated. The privileges thus conferred, were most grievous and oppressive; for by game was understood, whole droves of wild boars, and herds of deer not confined, but wandering over the whole country, to the destruction of the crops; and if any person presumed to kill them, he was liable to be sent to the galleys. It may easily be conceived, that the minute vexations, as well as the more prominent tyrannies, to which the feudal tenures gave rise, would occasion frequent disputes between the seigneur and his tenants; but the latter preferred submitting to them, rather than appealing to the decision of judges, who were absolutely dependent on the seigneurs.

We may here also notice the *corvées*, as one of the taxes peculiarly oppressive and injurious to agriculture, though not confined to the tenure we are now considering. By the *corvées*, individuals were obliged to mend the roads by their personal labor; hence it is evident that this tax must have fallen exclusively on the poor; or if it was performed by those who kept laborers, it must have deprived them of the means of fully attending to their agricultural operations. This tax was not only impolitic, in so much as it placed the repair of the roads under the care of those who were totally destitute of the little skill requisite for such a task, but it was an easy engine of oppression; for, under the pretence that the work might be done without interruption, those who were liable to the *corvée* had it frequently allotted to them at some leagues from their habitations. Besides these *corvées*, which were an oppression to agriculture over the whole of France, there were the military *corvées*, which fell only on the villages lying in the route of the troops; the inhabitants of which were obliged to leave their occupation, however inconvenient and injurious it might be, and repair the roads along which the soldiers were to travel. Such are a few of the oppressions under which agriculture in France labored, previously to the revolution, arising either from the feudal tenures, or from the more general operation of the laws and measures of government, the privileges of the nobility and clergy, and the usages of the country.

The fourth mode of occupying land, resembled that which is common in Ireland, and which is there complained of as a great grievance, and as the source of much misery and oppression. Men possessed of some property, hired great tracts of land at a money rent, and relet it in small divisions to *metayers*, who paid half the product. This mode of occupying land was most common in La Manche, Berry, Poitou, and Angoumois, but it was also met with in other provinces.

The last tenure was that of the *metayer*. These, who are a species of farmers that gradually succeeded to the slave cultivators of ancient times, and who, in Latin, are called *coloni partarii*, have been so long in disuse in England, that there is no English name for them. They may be generally described, as supplying the labor necessary to cultivate the land, while the proprietor furnishes them with the seed, cattle and instruments of husbandry, and, in short the whole stock necessary for cultivating the farm. The common

agreement was, that the produce should be equally divided between the proprietor and farmer, after setting aside what was necessary for keeping up the stock, which was restored to the proprietor, when the farmer either quitted, or was turned out of his farm.

Before the revolution, seven-eighths of the lands in France were held under this tenure. It pervaded almost every part of Sologne, Berry, La Manche, Limosin, Anjou, Burgundy, Bourbonnois, Nivernois, Auvergne, &c., and was found in Brittany, Maine, Provence and all of the southern districts. In general, the half of the produce was paid to the proprietor; but in Champagne only a third. There were also other variations; in some parts, the proprietor found half the cattle and seed, and the *metayer*, the labor and implements, besides paying the taxes; the last, in other districts, were partly paid by the proprietor. In Normandy, a singular species of this tenure prevailed, viz., on the farms which the proprietors kept in their own hands.

It is scarcely necessary to point out the miserable state of agriculture, which must exist in a country where the system of *metaying* prevails. In the first place, it proves a lamentable deficiency of agricultural capital; and, in the second place, it has a manifest tendency to perpetuate this evil, and to keep the tenant in the lowest state of dependence, misery, and poverty. In some parts of France, the *metayers* were so poor, and consequently so dependent on their landlords, that they were almost every year obliged to borrow from them their bread, before the harvest came round.

Such were the tenures of land before the revolution. Let us now inquire what effects that event has produced on them, and on the condition of the agricultural class in general.

In the first place, the number of small properties has been considerably increased in all parts of France. The national domains, which consisted of the confiscated estates of the church and emigrant nobility, were exposed to sale during the pecuniary distresses of the revolutionary government. For the accommodation of the lowest order of purchasers, they were divided into small portions, and five years were allowed for completing the payment. In consequence of this indulgence, and of the depreciation of assignats, the poorest classes of the peasantry were enabled to become proprietors, possessing from one to ten acres. They support themselves by cultivating these, and by laboring, at the same time, for the neighboring farmers. The number of small properties has also increased from another cause, since the revolution. Before that event, it seems to have been the law, or at least the invariable custom, in some parts of France, to divide the landed property among all the children. This local law, or custom, was extended, soon after the revolution, to the whole kingdom; so that, by the present law of France, land, on the death of a proprietor, is divided, by the law itself, among his children. The deplorable consequences which must ultimately result from this division and subdivision of little properties, in a country like France, already so fully appropriated, need not be pointed out; they are sufficiently obvious. We content ourselves with stating the fact, as illustrating one mode in which the tenure of landed property has been affected by the revolution.

In the second place, hiring at money rent is much more general since the revolution; and if France continues quiet, and recovers from the injurious consequences of the revolution, it may reasonably be expected that this species of tenure will become more and more prevalent.

In the third place, feudal tenures are done away as well as tithes, game laws, *corvées*, &c. In some parts, however, the tenants, by their covenants with their landlords, are still bound to perform some services, but by the law, they must be entirely of an agricultural description.

In the fourth place, the two other species of tenure, that is, monopoly, where men of property hired great tracts of land at a money-rent, and relet it in small divisions, and the system of metayage, still exist, though not nearly to such an extent, or in such an oppressive and ruinous form, as before the revolution. Indeed, when we consider that these species of tenure were the unavoidable and necessary consequences of inadequate agricultural capital, we cannot expect that they should be abolished by the mere operation of law, or by the direct effects of any revolution, however wisely planned and carried into execution. If, however, we find that they gradually die away, which seems to be the case, we may safely and rationally maintain, that the revolution, besides the direct benefits which it has bestowed on agriculture, by the abolition of feudal tenures, and partial and oppressive taxes, has indirectly proved advantageous to this first of all arts, by placing in the hands of those who pursue it more adequate capital.

Such are the benefits which the revolution has conferred on the agriculture of France, and which have manifested themselves, notwithstanding the military despotism, which, after exhausting and weakening her for the purpose of enslaving the continent of Europe, has at length brought down upon her a just retribution for her too ready acquiescence in its schemes. These, however, are only partial and temporary evils; and we may confidently predict, that when they are passed away, the agriculture of France, which, from her excellent climate and easily worked soil, must always be the staple branch of her national industry, and the principal source from which she must draw her political influence and military power, will be found to have come out from the ordeal purified and refined, and the condition of her agricultural population in every respect greatly ameliorated.

It is not easy to ascertain the distribution of the land in France. According to Mr. Young, there are of arable land 70,000,000 acres; under the culture of the vine 5,000,000; in woods 19,850,000, in meadow and rich pasturage 4,000,000 acres; under lucerne, sainfoin, &c. 5,000,000; and the pastures and wastes occupy 27,150,000; thus making a total of 131,000,000 acres. This estimate, however, as far as respects the number of acres under wood, is certainly over-rated, though Mr. Young on this point follows the authority of Mr. Necker; for a committee of the first National Assembly stated the whole extent of territory covered with wood at 13,100,691 arpents, of 100 perches of 28 square French feet each; whereas, according to Mr. Necker and Mr. Young, it amounted to 22,289,016 arpents. The general occupation of the land in the northern provinces of

France, may be conceived, from the following account of the distribution of a small commune. Woods and meadows in the occupation of the proprietor, 250 acres; two farms let, keeping two ploughs each, together eight horses, 300 acres; 10 freeholders, keeping one plough each, together 20 horses, 750 acres; 28 freeholders, keeping no horses, occupying 250 acres; in all, 1550 acres, of which 1300 were arable. These are distributed as follows: under fallow 433, under wheat 433, under oats 433. Those who have no ploughs pay 40 francs (33s. 4d.) per acre to their neighbors for the team labor of the whole course, viz. four ploughings on the fallow, and one ploughing for oats; four loads of dung per acre carted on the fallow, and the harvest carting. Those proprietors who possess no ploughs are laborers, and in general work for the person who performs the ploughing of their land. The number of acres ploughed in this commune annually is 2165, or about $7\frac{1}{2}$ acres per day for 14 ploughs, leaving sufficient time for harrowing, harvest, and the carting of dung.

The rent of land is low in most parts of France. Before the revolution, the rent of the arable and lucerne land was averaged by Mr. Young at 15s. 7d.; of the woods at 12s.; of the vineyards at 3l.: 16: 6; of the meadows at 2l.: 3: 9; and the wastes at 1s. 9d. At present, extremely good land in Normandy may be got for 30s. per acre; 18s. and 20s. are more common. In other districts, it is even very much lower. The price of land of course is proportionally low. Before the revolution, the average price of all the cultivated land in the kingdom, was estimated by Mr. Young at 20l. the English acre. In 1814, Mr. Birkbeck mentions an estate near Cosne of 1000 acres arable, and 500 wood land, let on lease for nine years for 375l. sterling, which might be bought for 22 years' purchase, or 8333l. It is proper to add, however, that one-third of the arable land of this farm was poor cold clay, of little value; two-thirds pretty good wheat land; part dry enough for turnips. In 1807, Mr. Pinckney states, that the average rents from Paris to Maine were about 15s. the English acre; and the purchase from 15l. to 18l. The value of lands in the vine districts of France, is much higher, amounting on an average to upwards of 60l. per acre, according to some authors; but others rate it only at 41l. per acre. The size of farms is in general small; few, even in Normandy and the other provinces where agriculture is conducted on the best plan, and with the greatest capital and skill, reaching 300 acres. With respect to the capital employed by the farmers, Mr. Young calculated it on an average of the whole kingdom, not to exceed 40s. per acre. In this, however, he was probably much mistaken. At any rate, at present, the average must be much higher. In French Flanders, it is calculated that a farm of about 250 English acres will require a capital of upwards of 1500l. sterling, or about 6l. 5s. per English acre. In this estimate, the livestock is supposed to cost 716l.: 16: 8; of which 15 horses at 16l.: 13: 4 each, 14 milch cows at 9l. each, and 180 sheep at 17s. 3d. each, form the chief articles. The instruments of husbandry form the next division of this estimate, and amount to 138l. Of these the large wagon is rated at upwards of 45l.; and lighter wagons, of which there are three, at nearly 20l.; four ploughs at 2l. 10s. each, besides a Dutch plough at 2l.: 12: 6;

the harrows, all of wood, at 8s. 4d. each. The third branch of the estimate is the servants' wages for 15 months. The number is eight; three ploughmen, one man to take care of the young horses, a shepherd, two women, and a swineherd; their wages, one with another, being 4l. : 11s. 8d. per annum each. The wages of the laborers are rated at from 8d. to 1s. per day. The maintenance of the 15 plough horses and 10 young horses for 15 months, is estimated at about 150l. It is probable that capital to the same amount is required in the other parts of France, where agriculture is well understood, and carried on with spirit and success. In the other districts, where it is far behind, of course the capital will be much less.

The prevailing opinion, that France is entirely an open country, is very erroneous. It is certainly much less inclosed than England. All Brittany, the western part of Normandy, and the northern part of that province as far as the Seine, most of Anjou and Maine, Lower Poitou, Touraine, Sologne, Berry, Limosin, the Bourbonnois, and a great part of Nivernois, part of Auvergne, and Quercy are inclosed. The whole district of the Pyrenees is thickly inclosed. This district of country comprehends 11,000 square leagues; so that if the other parts of France that are inclosed be added, they will raise the total to a full half of the kingdom. But though so large a portion is inclosed, the inclosures in general are ill-planned, and badly kept; and their value and utility so little understood, that the same rent is given for inclosed and open fields, provided both are arable. Perhaps the province of Berne exhibits more attention to the proper management of inclosures than most other districts of France. There is not a county in England closer, thicker, or better inclosed; and, what is uncommon in France, the gates and stiles are in good order. Commons are not met with in France, at least not in the same sense in which they occur in England; but common fields abound, and they are cursed with all the mischievous consequences which attend them in England, such as rights of common pasturage commencing on given days when under corn, and throughout the fallow year. There is a great deal of common field land in Picardy, Artois, part of Normandy, the Isle of France, Brie, the Pays de Beauce, and along the whole course of the Loire. In this last district, the farmers are in the practice of making an exchange with the poor, who have the right of common pasturage. This they buy off, assigning an acre or more to every cottage in the parish.

It is a singular circumstance, that some of the poorest and least improved provinces, are precisely those which are best and most generally inclosed: hence it is easy to perceive, that the mere existence of inclosures is not in France, as in England, a proof of the advancing state of agriculture. The chief cause of new inclosures in France, is, that the communities in many parishes, in different parts of the kingdom, and more especially in the vicinity of the Pyrenees, being proprietors of the wastes, sell them to any person who applies for the property, in absolute assignment; in consequence of which, the purchaser has the power of inclosure: whereas, in the waste plains of Brittany, Anjou, Maine, and Guienne, the seigneurs are the sole and absolute proprietors, and they will not sell, but only feu their es-

tates. Hence the waste lands remain unchanged and unimproved. The government of France, before the revolution, took some measures to enforce or facilitate a general inclosure with respect to some of the provinces, more particularly with regard to Lorraine, in 1764 and 1765; but the popular objections and prejudices against inclosures, had such weight, that at the commencement of the revolution, strong remonstrances were presented against them, and certainly the proportion of inclosed land has not considerably increased since that event.

The agricultural implements in general use in France are very rude and imperfect in principle as well as in construction; the plough in most parts is almost entirely of wood, and scratches and pushes forward the soil, instead of penetrating to any depth, or turning it over. In the vicinity of the Pyrenees, a light imperfect plough, similar to what the Romans used, and drawn by a pair of weak cows, is not uncommon. In the neighborhood of Toulouse, a better plough is seen, of pretty good construction, to which two strong oxen are yoked, the ploughman driving them by means of a long staff, that answers the double purpose of a goad and a paddle. The use of oxen in the plough is pretty general in France, and they are yoked in a different manner from what is practised in England: A piece of wood, of about one-sixth of the weight of an English yoke, is put across the forehead of the cattle, the extremities of which are neatly hollowed out, so as to fit the mould of the head, and the hollows lined with a piece of woolly sheep skin, to answer the purpose of a soft pad or cushion. This light and easy yoke is braced to the horns with a small thong of leather, to the middle of which the beam of the plough is attached; the animals are thus completely equipped for their labor. It seldom happens that more than two oxen are yoked in a plough. In the north of France, as well as in some of the eastern, western, and middle provinces, horses are more commonly used than oxen; generally two horses, but in some instances three. Besides the plough that is used for the general purposes of agriculture, in several districts, both in the north and south of the kingdom, a little plough called a *binot* is employed, principally for the purposes of fallowing and destroying the weeds. In some respects the *binot* resembles a plough, with a double or scuffler share, and two mould boards, but it has no coulter. In the French Netherlands, where agriculture is carried on in a regular and systematic manner, some farmers have three *binots* to eight ploughs, some two *binots* to five ploughs, and some two to four ploughs. Only one ploughman and two horses are employed; the furrow which it makes is from five to six inches in depth. Its operation is different from that of the common plough, since it does not turn over the land, but elevates it into small ridges, by which means the weeds are exposed to the action of the frost and of the dry weather. After the *binot*, the land is always ploughed for the seed furrows. The harrows, in general use, are equally imperfect in principle and construction with the ploughs, and have always wooden teeth. In most parts of France rollers are unknown, and their use is supplied by a plank, on which a boy rides over the land. Their carts and wagons display equal ignorance of mechani-

cal principles, being in general of enormous length; the carts which are used for the carriage of goods, are not above two-thirds so wide, and certainly two-thirds longer than those in England; they travel in large companies, frequently 16, 18, or 20 in a string together, especially in the south-east of France, each drawn by a single horse, with about half a dozen drivers attending them. The *charette*, or cart in common use, consists principally of two parts—the carriage and the body; the carriage part is very simple, being composed of two long shafts of wood, about 20 feet in length, connected together by cross bars, so as to form the bed; on this the boards are laid, as occasion may require: in the same manner, the sides, a front and back, may be added at pleasure. The axle and wheels are in the usual place and form. The moveable body is fixed on this carriage; it consists of a similar frame work, of two shafts, connected by cross bars. This body moves upon an axletree, and extending some feet beyond the carriage behind, it is let down with ease to recover its load, while the body, moving on a pivot, or axle, is easily purchased up from before.

In France, before the revolution, and even since that event, the construction and repair of the roads is entirely lodged with the government. The great military roads, especially that over the Simplon, are excellent, with respect to the principle on which they are constructed, the materials of which they are formed, and the whole of their execution. But the roads which were not necessary for military purposes have in many places been greatly neglected, although it was stated, in the year 1806, by the minister of finance, that more than thirty-five millions of francs were annually requisite for the reparation of the roads and public works. In 1809, a collection of laws was printed regarding the management of the roads; in which a law passed in the time of the republic, for establishing the use of broad cylindrical wheels, is strongly enforced. According to this law, the wheels of heavy wagons were to be nine inches three lines broad; and they are allowed to carry only a certain weight, which varies during the five winter and seven summer months. It was also enacted, that in those parts of the kingdom where the roads were paved, the passing upon the pavement should be suspended during those seasons when they were likely to be injured, and the side roads alone should be used. The weight allowed to be carried was not only to vary in winter and summer, but also according to the form of the wheels; and, in order to enforce this law, weighing engines were to be erected, and the owners of carriages exceeding the legal weights were declared liable to severe fines. But these laws have been very partially enforced; so that some of the best roads in France, under the old government, have fallen into complete disrepair. This has been very particularly the case with the famous *chaussée* of Languedoc, which begins at Villeneuve, whence it crosses the whole province. The cross roads have suffered still more than the main roads since the revolution; and both have suffered more in the Atlantic departments, than in any other districts of France. Throughout the whole department of Finistère, the cross roads are in a most wretched state. The roads, in several respects, differ from the roads in England; they are ge-

nerally broad, always straight, paved, and planted on both sides with chestnut trees, poplars, walnut, mulberry, and other fruit trees. There are 28 principal roads from Paris to the boundaries of the kingdom. Turnpike gates and tolls have been established since the revolution, at the distance of five kilometers from each other.

The state of agriculture in any country may generally be pretty well ascertained from the rotation of crops which is pursued. If these are conducted on good principles, the agriculture can scarcely be very bad; on the contrary, if bad rotations are pursued, agriculture has made very trifling advances towards perfection. If we judge of France according to this rule, we shall decide, that, though over by far the greatest part of the kingdom agriculture is in a miserable state, yet in some parts it is well understood and flourishing.

We have already mentioned the divisions of France into districts, according to the nature of the soil; we shall now note the principal rotations pursued in each district. In the district of rich loam, two rotations principally prevail, according to one of which, in Flanders and part of Artois, there is no fallow, but a constant succession of crops. The most approved and productive rotation is found between Valenciennes and Lille: it consists of wheat, and turnips after it the same year; oats, clover, wheat, hemp, wheat, flax, coleseed, wheat, beans, wheat. In the provinces of Picardy, Isle of France, Normandy, and the other parts of Artois, the usual rotation was not in general so good, consisting of fallow, wheat, and spring corn. In some parts of Normandy, however, fallows are not known; and in other parts, especially between Dieppe and Rouen, where the soil is a deep hazel mould upon chalk, fallow occurs only once in six years; the rotation being fallow, wheat, peas, vetches, flax, or rape seed: wheat, clover, oats. In the rich plain of Alsace, the fields are never fallowed; the fallow crops being potatoes, poppies for oil, peas, maize, vetches, clover, beans, hemp, tobacco, and cabbages. In the Limagne of Auvergne, one of the richest districts of France, fallows are partially used; but the usual rotations in other respects, are so severe, that only such a soil and climate could bear them; it is not unusual to sow rye after wheat, and wheat after rye. The latter grain is often sown on their best land; and wheat on their worst: a common rotation is barley, rye, hemp, rye: wheat is grown also after beans: two crops in the year are not unusual.

As soon as ever the maize district of France is entered upon, fallows disappear; that grain being cultivated in such a manner as to preclude the necessity of a fallow. In the plain of the Garonne, the usual rotation is maize, wheat; and here also is first found the culture of different species of vetches, which are sown both in September and in the spring; and, together with hemp and maize, assist in banishing fallows. Yet even in this highly favored district, rye is often grown where wheat might be cultivated with advantage. Turnips are a second crop after wheat and rye. The culture of the white lupin is common here.

In the heath district great quantities of buck wheat are grown, and in some parts parsnips: but broom is the great object and source of profit; the common course being broom sown with oats. The broom is fed for three or four years, and then cut; after it wheat is taken, then rye, buckwheat, and

oats, or broom. This last is cultivated for fuel, as the district has neither coal nor wood. When the land is exhausted by this mode of cropping, it is pared and burned, abandoned, and by some time recovered, that a succession of crops may bring it once more into the same situation.

In Gascony, the usual rotations are, maize, wheat and turnips; maize, clover cut once, and then ploughed up for maize again; rye, millet, haricots or kidney-beans; maize, rye, millet; and maize, rye, clover.

In the districts of the Pyrenees, where irrigation is practised with considerable skill, and on an extensive scale, fallow is superseded by the culture of clover, millet, maize and haricots. Maize, however, is not cultivated in such large quantities as in other parts. Two crops are gained every year; but where irrigation is not practised, the ground is fallowed, and afterwards millet, haricots, or barley sown for forage, before the wheat is put in. In Dauphiny, buckwheat is sown on the wheat stubbles; and, such is the earliness of the climate, that it is frequently in full blossom by the end of August.

The rotation in the stony district is particularly distinguished by the introduction of potatoes in some parts of it, as a preparation for wheat. Where this root is not cultivated on a large scale, and as a crop in regular rotation, the common course is fallow, wheat or rye, and barley or oats. In the district of chalk, the rotation in general is very bad. In the province of Sologne, it is fallow and rye: certainly the very worst and most unprofitable that can be practised on any land. In the district of gravel, especially in the Bourbonnois and Nivernois, the same wretched rotation is pursued. The district of various loams is chiefly distinguished by the introduction of turnips into the rotation; but, as we shall afterwards have occasion to remark, the culture of this valuable root is ill understood in France.

From this account of the most common rotations in various parts of France, it will be seen, that in general they are conducted on very erroneous principles; and that, even where they are good, the climate ought to have the merit rather than the skill of the agriculturist. In the south of France, the climate enables him to take two crops in the season. This advantage is, however, also derived in French Flanders entirely through the attention and skill of the farmer. The second crops in that district being carrots, turnips, spurry and yellow clover.

The following, perhaps, will give a sufficiently precise and clear view of the general rotations practised in France. The arable land, that comprises nearly the whole of the kingdom, with the exception of the vineyards, and a few tracts of mountain, may be divided into five classes, with respect to fertility of soil. The first class bears a crop every year, as in most parts of French Flanders, some parts of Normandy, the Limange of Auvergne, the neighborhood of Toulouse, and generally where maize is cultivated, or irrigation employed. The second class, which is rather inferior in point of soil, but is still good land, is cultivated with the intervention of a fallow once in six years, as about Dieppe and Rouen particularly; once in five years, as in some parts of French Flanders, and in a few other districts. The third class of land, of middling quality, which embraces

a large portion of the kingdom, is managed on the old plan, of fallow, wheat, oats, or barley. The fourth, still poorer land, is fallow and wheat alternately; and the last class of land, where the soil is in general miserably poor, is cultivated in the round of fallow, rye, rest without grass-seeds. As it is probable that the three last classes of soil comprise half the cultivated surface, and as half of them are fallow, it appears that one-fourth of the whole country is lying in a state entirely unproductive. The best husbandry in France, then, is in the south and in the north; in the former, the goodness of the climate enables the agriculturist to raise maize and wheat alternately, and to have second crops of millet, clover, lupine, &c.; and in the north, the skill of the agriculturist has, in a great measure, banished fallow. On the whole, so far as respects rotation of crops, French agriculture cannot be much praised; and it will be seen, that the management of the principal crops is in general not better conducted than the rotation. Before, however, we proceed to notice the culture of particular crops, it is proper to mention, that the application of land to the crops best suited to it is not well understood. Even in many parts of Normandy, land that would bear heavy crops of wheat is not unfrequently sown with barley; and rye in many parts is sown, where the soil is admirably adapted for wheat. It not unfrequently happens, too, that rye is sown along with wheat; the consequence of which is, that, as the former ripens three weeks or a month sooner than the wheat, when the latter is reaped, almost the whole of the former is shed and lost.

Different kinds of wheat are grown in France; the principal of which are the bearded wheat, various species of the common winter wheat, and spring wheat. What in England is called hedge wheat, where it is of comparatively late introduction, has been long known in the north of France, particularly at Calais, Lisle, and Dunkirk; it is known there by the name of pullet wheat (*blé pullet*), or white wheat, (*blanc blé*), and it is regarded as wheat of the first quality. One of the best kinds of spring or summer wheat known in France, is called *blé tremois*; the real summer wheat, *triticum aestivum*—it is sown with success so late as the end of May, and yields a large increase. The straw, too, is excellent fodder. The produce of wheat in France per acre is small: Even in the best cultivated districts, and on the best soil, it cannot be averaged at more than 18 or 20 bushels per English acre. In most places it is reaped; this operation being performed, like the other agricultural operations in France, chiefly by women. In other districts, however, it is mown: the whole process of harvesting is very carelessly performed. In a good year, in Picardy, 40 sheaves are calculated to produce a septier of wheat of 240 lbs. The principal wheat districts of France, are French Flanders, Artois, Picardy, part of Normandy, the Limagne of Auvergne, part of Alsace, &c. Beauce, a province which lies between the Isle of France, Blois, and Orléans, and which now forms the department of the Eure and Loire, is so extremely fertile of wheat as to be called the granary of Paris. The wheat of Narbonne is in high repute for seed.

Barley is not extensively or judiciously cultivated in France. There are two sorts: the one which the French call square barley, or barley of

autumn, because they sow it in that season; the other is called spring barley: This is the common sort sown in France; they begin to sow it towards the end of April. This grain is the common food in many parts; either made into bread by itself, or mixed with wheat flour. It is also made into peeled barley: the best peeled barley comes from Vitry-le-François, a considerable town in the department of Marne. Good peeled barley is also made at Charenton, near Paris. Respecting the culture of oats, there is nothing that calls for notice. Rye, as it may have been observed from the rotations which have been specified, is very generally cultivated, principally for its grain, but in some places as green food. In the latter way, the ridges of the wheat stubble are split down, as early as possible after the crop is off the ground, and rye is sown, which in April or May is cut for the cattle; and, if the weather proves favorable, in some parts of France it is mown three times. The rye in France is very liable to a disease called *ergot*, which seems to be unknown here; and which produces, in those who eat the grain so affected, the most dreadful complaints. The average produce of rye, when reaped, is very small, perhaps not more than 15 or 16 bushels the English acre.

The annual produce of wheat, rye, barley, and oats, which may be considered as the chief arable products of France, has been differently estimated; and, indeed, only an approximation to the truth can be looked for on this account. According to Vauban, in his time, the annual produce of these grains was 59,175,000 septiers of 12 Paris bushels, or 240 pounds weight. According to Quesnay, the father of the sect of the economists, it was 45,000,000 septiers. In the opinion of the Abbé d'Expilly, 78,472,380. Lavoisier calculated it at 50,000,000 septiers; and Mr. Arthur Young at 75,000,000. The variations here are very considerable; but if we take the average of all these sums, it will give 61,519,672 septiers, as the annual produce of wheat, barley, oats and rye in France. The proportions of these different grains it is not easy even to conjecture, with any probability of approaching the truth. Rye and wheat are certainly produced in by far the greatest proportions; perhaps in pretty nearly equal proportions. Barley and oats are cultivated on a very small scale; the latter, especially in the south, from the too great heat of the climate, are not so much grown as in the north, and where grown, are in general unproductive.

Beans, such as we cultivate in England, are principally grown in French Flanders; besides these, the French grow what they call *feves de marais*, or beans of the marsh, which they eat only when green and fresh. They also dry them, but in that state they serve only as food for cattle. Some persons eat them in Lent; buying them green, and peeling the skin off, they split them in two, and dry them in the open air. Haricots or kidney beans are pretty generally cultivated as a fallow crop; they are carefully hoed, and are very productive.

The limits of the maize district have already been noticed, in treating of the climate of France; and the importance of this grain in an agricultural point of view, has also been sufficiently pointed out, in the account of the rotations pursued in the south of the kingdom. It is planted in rows or

squares, so far asunder that all necessary tillage may be given between them. A considerable part of the summer it affords, as it were, a rich meadow, the leaves being stripped regularly for oxen, affording a succulent and most fattening food, which accounts for the high order of all the cattle in the south of France. The meal of maize, besides being used extensively as food for man, is also employed for fattening oxen, hogs, and poultry. Thus it appears that this most valuable grain is a meadow to feed the cattle in summer, and nourishing food to fatten them in winter. In some parts of France, it is sown broadcast and thick, for the purpose of mowing to suit cattle. This practice is pursued in the northern districts, where the climate is not sufficiently warm to ripen it; and even in the southern districts it is not uncommon to sow it as an after crop, in the same manner, and for the same purpose. Near Rousillon, it is sown in May, to be cut green in August, at which time more is generally in progress, to be applied to the same purpose in December. In the north, it is sown in the beginning of May, on well dunged fallow, and cut when beginning to come into ear. An arpent will maintain four cows from June to September; and the wheat that succeeds is always good. Although maize is undoubtedly an exhausting crop, yet in the Pays de Basques, on the low and humid lands of that province, it is cultivated for three years successively without manures; and this mode of farming, which is particularly mentioned by M. Parmentier in his *Mémoire sur le Maïs*, is even recommended as good by that author.

As maize, where intended to stand for harvest, is always planted in rows, little seed is required; in general, only the eighth part of the seed which would be necessary if wheat were sown; and the arpent yields more than double of that grain. In some very fertile and well managed spots, an arpent has yielded 2400 pounds. It is commonly ripe in the month of September; and even when later, the grain is protected from the inclemency of the season, by its broad and strong leaves. It is usual in most parts of France, to spread it under the roofs of the cottages to dry; the eaves of the houses being made to project 10 or 12 feet from the plane of the walls for this purpose. When the corn is cut, it is tied up in bunches, and suspended from light rafters, horizontally placed under the shelter of these eaves.

Buckwheat is cultivated to considerable extent, particularly on the poorer soils; and being of rapid growth, sufficient time is allowed to clean the land, before the succeeding crop of wheat or rye is sown. It is much used as food for man; and, in some parts, as has been already noticed, as green food for cattle: in this case, it is a stubble crop.

A very few years before the revolution, considerable exertions were made by the intendants of the several provinces, to introduce the regular and general culture of turnips. They distributed seed, and published small treatises on the proper management, and great advantages of this root; but their exertions seem to have been in a great measure unsuccessful; for turnips are very little cultivated in any part of France. Mr. Birkbeck, who travelled in 1814 from Dieppe through Paris and Lyons to the Pyrenees, and back by the route of Toulouse, says he did not see a single acre of turnips, or even of raves, in his whole journey. That

they are not grown in the south of France, he ascribes to the extreme dryness of the climate. This undoubtedly would render them a very precarious crop; but when he assigns the severity of the winter in the northern districts of France, as the cause of their not being cultivated there, his reason does not seem equally good. In fact, they are cultivated in French Flanders, in Alsace, Lorraine, and in the other districts in the north and east; and it appears from Mr. Young's Tour, in 1787, 1788, 1789, that at that period they were not entirely unknown, even in the middle and southern districts. In the department of the Lot, *raves*, that is a kind of turnips with a carrot root, long, thin, and poor, are cultivated; These are also grown near Caen in Normandy, in the road to Bayeaux; and in Bresse, or the department of the Ain, where they are known under the denomination of *navets*. Between St Palis and Bayonne, many turnips are grown in a singular husbandry; the wheat stubble is either burnt by itself, or where it has not been left long enough, straw is spread over it, and then it is set on fire. The ground thus cleaned of weeds, as well as manured, is then sown with turnips. On the whole, however, the culture of this valuable root is very partially known in France; and where known, is miserably conducted, as no hoeing is ever given to it.

(To be continued.)

BEES.

From the Cultivator.

Mr. Keith, of Maine, in a communication to the Monthly Visitor, after describing several modes of managing bees, and the ill success that attended them, thus in substance gives the result of an experiment made by placing them in a garret. He finished a room in his garret impervious to rats and mice, to which was a door secured against children and intruders. In this room was placed a swarm of bees, the hive on a level with and near the places made for their egress and ingress. The young swarm soon filled their hive, and then commenced building all around it, filling in with the finest comb, and without the support of slate or bars, the space from the roof to the floor of their room. Mr. Keith, by the aid of a candle, was able at any time to inspect the progress of his apiary, and witness the formations of the column of comb. There was no swarming, and of course the work had the benefit of all their increase in numbers. After the second year of their operations, Mr. Keith commenced taking honey from the room, doing it in the winter when the bees were dormant, in the central parts of the mass; these external combs always composing the best and purest part of the store. For many years Mr. Keith's table was abundantly supplied in this way with the choicest of sweets, until in 18— his dwelling house was destroyed by fire, and his bee-hive, "containing at the least eight hundred pounds of honey, and of living beings a multitude which no man could number," shared the common fate.

From what we have seen, and have been able to learn on this subject, the mode of treating bees as above described is superior to most others, for the following reasons. It prevents in most cases any

swarming; the bees are not as frequently attacked and destroyed by the bee-moth; there is no necessity of destroying the bee as is the common but cruel practice; and the store of honey is always at command. The honey bee is one of the most valuable of our manufacturers; and that, and the silk-worm almost the only insects that contribute by their industry to the comfort of man.

PROCEEDINGS OF THE TOBACCO CONVENTION.

[When giving a place to the following report, on a subject so interesting to all tobacco cultivators, we cannot but express our surprise, as well as regret, that not one person from Virginia attended the meeting. This is another and a striking example of the complete torpidity of the agricultural class of Virginia, in all matters relating to their peculiar interests and duties.—ED. F. REG.]

From the National Intelligencer.

Washington, Friday, May 1st.

The convention of the tobacco planters of the United States assembled in the chamber of the board of aldermen, at the City Hall, this day.

Delegates were present from Maryland, Virginia and Kentucky. Delegates had also been appointed from North Carolina, Tennessee, Missouri, and other states, but had not arrived.

At 12 o'clock, the convention was called to order by Mr. Jenifer, of Maryland who said that he had to announce, with great regret, that he had received a letter from Governor Barbour, the president of the convention of tobacco planters held three years since, and who still, had he been present, would have been the presiding officer, stating that he would be unable to attend, in consequence of duties detaining him at home, and expressing the regret which he felt at the circumstance.

Mr. J. suggested, therefore, that the convention should now appoint a president, with a view to organize and proceed to business. And he nominated for that office Gov. Sprigg, of Maryland; who was unanimously appointed.

The President having taken the chair—

Mr. Jenifer suggested that the convention now proceed to appoint a vice president and secretary. And he would nominate for the former office a gentleman who, although a stranger among them, came there highly recommended by his character and position—Mr. Benj. Jones, of Petersburg. This nomination was unanimously agreed to.

On motion of Mr. W. T. Wooton, of Maryland, Mr. J. S. Skinner, of that state, was appointed secretary.

And on motion of Mr. Thomas T. Somerville, of Maryland, Mr. John Mercer of that state was appointed assistant secretary.

The convention having been thus organized—

The president said he presumed it would probably be within the contemplation of the convention to appoint a committee at this time, for the purpose of taking the subject upon which the convention had met, generally into consideration; and who would be authorized to report at any hour to which the convention might adjourn to morrow.

The convention was then addressed by Messrs.

Jenifer, of Maryland, Triplett, of Kentucky, and Keech, of Prince George's county, Maryland; and, also, by Mr. Dodge, the agent appointed by the government to visit Europe for the purpose of procuring information on the subject of the tobacco trade, who laid before the convention some interesting statistical statements, the results of his investigations.

After which, Mr. R. W. Bowie offered the following resolution:

Resolved, That a committee of — be appointed by the president to consider and recommend such measures as may be deemed most expedient to be adopted, to accomplish the objects contemplated by this convention.

Mr. Triplett suggested, as an amendment to the resolution, the addition, at the end thereof, of the words "and that the committee 'he requested to make report at 11 o'clock A. M. to-morrow.'"

Mr. Bowie accepted the modification; and the resolution, as modified, was adopted.

And the blank was ordered to be filled with the number ten.

The President announced the following gentlemen members of the committee:

R. W. Bowie, chairman,	Wm. J. Blackstone,
Thomas A. Somerville,	John Mercer,
John Barnes,	Baruch Mullikin,
Benjamin Jones,	Edward Hamilton,
Thomas F. Bowie,	Alexander Keech,

Mr. Jenifer, after urging a punctual attendance to-morrow morning, suggested that any friends who were in the tobacco interest, and were in the city, be invited to attend, and that such members of congress as thought proper should attend also as members of the convention; which suggestions having been assented to—

On motion of Mr. Jenifer, the convention adjourned until 11 o'clock to-morrow morning.

HENRY GODFREY WHEELER.

Reporter to the convention.

Saturday, May 2, 1840.

Pursuant to adjournment, the convention re-assembled this day at 11 o'clock.

Mr. Jenifer offered a resolution, which was unanimously adopted, returning thanks to the mayor and common council for tendering to the convention during its sittings the use of the chamber of the board of aldermen.

Mr. R. W. Bowie made the following report:

The committee appointed by the convention of tobacco planters now assembled in this city, with instructions to prepare and report to this convention such measures as may be deemed expedient to accomplish the objects contemplated by the convention, beg leave respectfully to submit the following report:

The statistical statement, respecting the enormous duties and exactions imposed on American tobacco, which was laid before the convention yesterday morning, and which is herewith again presented as a part of this report, showing "that Europe levies a revenue of about thirty millions of dollars on about 100,000 hogsheads of American tobacco, which cost in the United States about seven millions.

These duties and exactions appear to be so enormous that your committee have thought it necessary to examine them with the greatest attention, and have come to the conclusion that, enormous

as they are, the following facts show that there is no exaggeration.

Russia.

On examining the statement above mentioned, it will be seen that during three years, that is, from the 1st of October, 1835, to 30th of September 1838, the average direct exportations from the United States to that country amounted to 181 hogsheads but the actual consumption in Russia may be considered as much greater, and may be safely estimated at 458 hhds. annually, the difference over the direct importations arising from the entrepôts of England, Holland and the Hance Towns, etc. The revenue derived from American tobacco may be safely estimated at about \$64,000.

Holland.

The average direct importations of our tobacco to that country during the three years aforementioned amounted to 19,815 hogsheads, but large importations are annually made from England. In 1837 there were exported from that country to Holland about 1,500 hogsheds of American tobacco, so that the total importations may be estimated at 21,315 hogsheads of our tobacco, the greatest proportion of which was afterwards re-exported to Germany and other countries of Europe.

The consumption of Holland may be estimated at about 3,300 hogsheads of American tobacco: the duty is very trifling, but we have a right to complain—1st, of the unjust difference made between Maryland and the other tobaccos of our country, for whilst Virginia, etc. are admitted at 12 1-2 cents, Maryland tobacco is charged with a duty of 14½ per 100 lbs. American, and stems are assimilated to Maryland; and secondly, that none of our tobaccos are admitted at the same favorable rate of duty as the tobacco of some other countries. For example: East India is admitted at 5 1-5 cents, Brazil at 8 4-5 cents, and that coming from the Ukraine and other countries of Europe at 11 3-8 cents per 100 lbs. American. The revenues derived from American tobacco in Holland may be estimated at about \$5,600.

Belgium.

The average direct exportations of our tobacco to that country during the said three years was 2,457 hogsheads; the importations from England in 1837 were about 3,500 hogsheads of American tobacco; so that the total importations into Belgium may be estimated at about 6,000 hogsheads of our tobacco.

It is extremely difficult to form any correct estimate of the real consumption of American tobacco in Belgium, the smuggling carried on from that country into France being very great; besides, several hundred hogsheads are re-exported to Germany; but the consumption, your committee believe, may be estimated, in round numbers, at 4,000 hogsheads. The duty on American tobacco is, on Virginia, &c. 23 1-2 cents, on Maryland 26 2-3 cents, and on stems 26 2-3 cents per 100 pounds, American. These duties are far from being heavy; but still we find, in this case, the same unjust difference established between the Maryland and the other tobaccos of our country. We likewise have cause to complain that the tobaccos of some other countries are admitted at a less rate of duty than the American, for, on examining the Belgian tariff, it will be found that the East India tobacco is admitted at 10 cents, and

Brazil at 16 1-2 cents per 100 lbs. American. The revenue derived from the above quantity of American tobacco may be estimated at about \$11,600.

Great Britain.

The average direct exportation of our tobacco to that country for the said three years has been 28,773 hogsheads. The annual average consumption may be estimated at 18,000 hogsheads American tobacco, which, by the calculations in the statement before referred to, render a gross revenue of \$17,275,700. The duty of 3 shillings sterling per pound, equal to 72 3-4 cents, is enormous, and, if put on for sake of revenue, there is no doubt that it defeats its own object; for it cannot be doubted that, if this duty should be greatly diminished, Great Britain would be a gainer in the net revenue collected from it, inasmuch as it would necessarily lead to a proportionately increased consumption.

Great Britain should take into consideration that there is no duty levied in the United States on any of her produce or manufactures which can in any manner be compared with the enormous duty of 72 3-4 cents per pound, or over 800 per cent. on our tobaccos; [and that this duty weighing particularly heavy on those sections of our country which have been the most favorably disposed to a low rate of duties in the United States, and it certainly becomes an important question for Great Britain to take into serious consideration whether she can expect that those sections of our country will continue to be favorably disposed to low rates of duties on British produce and manufactures should the government of that country continue to levy such an enormous duty on one of the principal staples of American industry.]

France.

The same observations may be applied to France as to Great Britain. In France, the monopoly of the Regie weighs still heavier on our tobacco interests; for, whilst in England there are 18,000 hogsheads consumed, in France, having a greater population, not much more than one-half of that quantity is consumed.

By the statement already referred to, it will be observed that the profits resulting from the monopoly paid into the French treasury by the Regie, in 1837, amounted to over eleven millions of dollars. These were the net profits, and if the expenses of the Regie, which are very great, should be added to that amount, there is no doubt that the gross revenue would be fifteen millions of dollars; and, as a considerable proportion of American tobacco is employed principally to mix with the native tobacco, in order to render the quality of the manufactured article more valuable, it may therefore safely be estimated that the revenue derived from France, either directly or indirectly, from American tobacco alone, amounts to five and a half millions of dollars, being probably more than double the amount of revenue obtained by the United States from all the importations into this country from France.

Spain.

In that country a monopoly of the Regie exists. The average exports from the United States, as will be seen by the statement already referred to, were 1,729 hogsheads. There were also exported from England in 1837 about 1,150 hogsheads of American tobacco. Large quantities, it is presumed, are also smuggled from Gibraltar; so that the total annual consumption of American tobacco

may be estimated at about 5,700 hogsheads. From information before the committee, it is believed that the gross revenue derived from the Regie may be safely estimated at eight millions of dollars; and, as the American tobacco employed is in the proportion of about five-eighths of the whole, the gross revenue derived therefrom may be estimated at about five millions of dollars from American tobacco.

Portugal.

In that country a monopoly by the farm (that is, the right to deal in the article under a license sold by the government) exists. The direct average exportations were only 77 hogsheads, but the average exportations of our tobacco from England to Portugal may be estimated at about 90 hogsheads. The legal importations into that country may therefore be estimated at about 363 hogsheads annually.

The net revenue derived from tobacco through the farm was, a few years ago, as follows:

Amount of the lease to the farm, or persons or company obtaining the license for the monopoly, per year	\$1,400,000
Amount of the import duty	195,116
But to the foregoing there should also be added to the amount which the farm has also to pay to the government for pensions to the former officers of the old tobacco administration	24,677

\$1,620,093

And, as the quantity of American tobacco legally consumed, was about one-third of the whole manufactured, the net revenues from American tobacco may be estimated at about \$540,000. Although tobacco can only be admitted on account of the farm, yet it is subject to a duty of \$8 36 on American and \$6 27 per 100 lbs. on Brazil.

Italy.

Throughout Italy monopolies of tobacco exist, either being a Regie of the states, or it is farmed out by the government.

In Sardinia, it is a Regie, and the profits from the monopoly must be very great.

In the Roman states it is also a Regie. The consumption of American tobacco may be estimated at about 300 hogsheads. The profits are unquestionably great.

In Tuscany it is farmed out. The consumption of American tobacco may be estimated at about 425 hogsheads, and the profits from the monopoly from that quantity at about \$140,000.

In Parma, the American tobacco is employed in making the first class of snuff, and the consumption may be estimated at about 130 hogsheads. In 1834, the Government obtained a gross revenue of about \$106,460, from all qualities of tobacco.

In Naples, it is farmed out. The quantity of American tobacco may be estimated at about 400 hogsheads and the revenue derived through the farm at about \$400,000.

In the Austrian dominions, with the exception of Hungary, it is a Regie. The consumption of American tobacco may be estimated at about 4,000 hogsheads, which is partly imported into Trieste direct from the United States, but the greatest proportion is obtained from the entrepôts of Holland and the Hanse Towns. The profits derived through the Regie must be very great.

In the rest of Germany, where a large proportion of our tobacco is consumed, the revenue derived from it may be estimated at about \$1,200,000. The committee cannot conclude this report without calling the attention of the convention to the important fact that the average value of the tobacco exported to various countries of Europe was, from 1st of October, 1835, to 30th September, 1838, \$7,267,794, and that, during the same period, the average value of our domestic produce exported annually to the same countries was \$79,201,860. Hence it appears that the article of tobacco, the chief staple of those represented by this convention, constitutes in value about one-tenth of the whole export of our domestic produce to Europe; and it may be presumed that an equal proportion of the population of the country has a direct interest in, if not an absolute dependence upon the cultivation and trade of that important, and, hitherto, too much neglected branch of American industry.

In view of the facts and considerations here presented, the committee respectfully recommend the adoption of the following resolutions:

Resolved, That this convention views with deep regret, and sense of injury, the continued heavy burdens imposed upon tobacco imported from the United States into foreign countries whose products and manufactures are admitted into this country entirely free of, or at nominal duty. That this inequality is at war with that spirit of reciprocity by which friendly commercial nations should be governed, and that a longer submission to it by the government of the United States would be unjust to the tobacco planters, destructive of their interests, and evince a gross want of attention to their just remonstrances.

Resolved, That a committee of three be appointed by the president of this convention to draught a memorial to the congress of the United States, urging the adoption of such measures as may be best calculated to effect a modification or repeal of the high duties and restrictions in foreign countries upon tobacco imported from the United States; and that the senators and representatives in congress from the tobacco-growing states be, and they are hereby requested to use their efforts to accomplish these objects.

Resolved, That a committee of five be appointed by the president of this convention to draft an address to the tobacco planters of the United States, setting forth their grievances, and urging them to lose no time in memorializing congress to relieve them, so far as that may be done by national legislation, from oppressions already too long endured—and which, when they are fully understood, cannot be quietly submitted to.

Resolved, That this convention recognize with grateful satisfaction the measures which have already been employed, with auspicious effect, to procure the adoption by foreign governments of measures of just reciprocity in regard to the interests represented by this convention, and that they entertain and hereby respectfully express the hope that the government of the United States will persevere in its exertions to accomplish the reduction or repeal of the heavy duties and restrictions of which we complain.

Resolved, That a copy of the proceedings of this convention be communicated to the president of the United States, and to each of the senators and repre-

sentatives in congress from the tobacco-growing states.

The report and resolutions having been read, a debate followed, in which Messrs. Dromgoole, Jenifer, R. W. Bowie, Triplett, Thomas F. Bowie, Hamilton, Keech, and Duckitt, participated.

After which, that portion of the report which is within brackets, was stricken out.

The resolutions were taken up seriatim and adopted; and the question being then taken on the whole, the report, as amended, and the resolutions, were unanimously adopted.

The president thereupon appointed Messrs. Jenifer, Triplett, and Benjamin Jones, of Virginia, a committee to carry out the purposes of 2d resolution.

And Messrs. Triplett, R. W. Bowie, Daniel Jenifer, George C. Dromgoole, and John Mercer, a committee to carry out the purposes of the third resolution.

On motion of Mr. Thos. F. Bowie, it was unanimously

Resolved, That, in the opinion of this convention, the time has arrived when a journal devoted to the great tobacco interest should be selected and patronized by this convention and all others engaged in its cultivation; and that the American Farmer (edited by J. S. Skinner, Esq.,) be selected as a suitable organ for the diffusion of information on this important branch of American industry.

After some collateral proceedings—

Mr. Triplett offered the following resolution, which was unanimously adopted:

Resolved, That the president of this convention have power, and he is requested, to call a tobacco convention when, in his opinion, the interest of the tobacco planters may require it.

Mr. R. W. Bowie offered the following resolution, which was unanimously adopted:

Resolved, That it be recommended to the tobacco planters, and all others connected with the tobacco business in the United States, to hold meetings in their respective districts to respond to the proceedings of this convention.

And the business before the convention having been now disposed of—

On motion of Mr. R. W. Bowie, it was unanimously

Resolved, That the thanks of this convention be tendered to the president and vice president of this convention for their able and dignified discharge of the duties of the chair.

And then, on motion of Mr. Thos. F. Bowie, the convention adjourned.

HENRY GODFREY WHEELER,
Reporter to the convention.

MILK.

From the Farmers' Cabinet.

From careful experiments and observations made by Dr. Schubler, professor of chemistry applied to agriculture, in the celebrated institution of Fellenburg, at Hofwyl, in Switzerland, he says, he found the morning's milk commonly to yield some hundredths more cream than the evening's, at the same temperature; and that in milking cows, this singular phenomenon is observed, that the milk obtained from one and the same milking, differs considerably in quality: that, contrary to what might

be expected, the milk first extracted, is not the best—but that which is obtained the last contains invariably the largest proportion of cream. To satisfy himself thoroughly on this point, he caused a meal's milk of one cow to be milked into five vessels of the same size, and then separately examined the milk in each in the order in which it was taken.

No. 1, or that drawn first, gave 5 per c. of cream.

" 2, - - - - - gave 8 - do.

" 3, - - - - - gave 11,5 do.

" 4, - - - - - gave 13,5 do.

" 5, - - - - - gave 17,5 do.

Making an average of the whole of 11,05 per cent.

He extended his experiments so as to test the quantity of caseous or cheesy matter obtained from different drawings of milk, which displayed a similar result—proving, in the most satisfactory manner, that the last drawings of the milk were constantly much richer, both in butter and cheese, than the first; and demonstrating in the most conclusive manner the vast importance to the farmer, of having *trusty* milkmaids, who will tug away as long as a drop of the precious fluid remains in the udder.

ADDRESS TO THE AGRICULTURAL SOCIETY OF CUMBERLAND.

By W. S. Morton, President.

[Communicated for the Register by order of the Society.]

GENTLEMEN—The deplorable condition of agriculture in our state has perhaps been the theme of as much idle declamation and fruitless regret as any other subject of general interest. Anxious inquiries have been instituted into the causes which have produced this condition, by some of our ablest men. The evil has been traced to various causes. The apathy of our legislature, in relation to the interests of agriculture, has been condemned. Our geographical locality has, by some, been thought to produce insurmountable obstacles to agricultural prosperity, inasmuch as we are, by it, precluded from a market for those crops best comporting with an improvement of the soil. Our failure has also been charged upon our eager fondness for politics and political excitement. We have also blamed our ancestors for cutting down and wearing out our best lands, and rearing us in opinions and habits unsuitable to successful improvement. In short, we have been disposed to throw the blame any where else but on ourselves. Wherever the reproach may be lodged, the evil still exists. There is now nearly the same cause for lamentation, over gullied and barren fields, and wide-spread wastes, as existed about forty years ago, when John Taylor was exerting his powerful and patriotic mind, for the improvement of agriculture. Indeed, it is highly probable, that although there may have been a multitude of instances of individual improvement, yet, that since that time, the soil of the state has, in aggregate value, greatly lost. With this belief, some have despaired of our good old commonwealth, and supposed that she was formed to shine, for a while, as "the mother of states," and was doomed then to wither and die, like the moth. But, gentlemen, in this cause, it seems something like treason to despair.

We all can see that something is greatly wrong. Instead of searching for those on whom to throw blame, let us assume much of it to ourselves. The remedy, if there be any, must be sought by ourselves and our compeers. Let "*nil desperandum*"—"don't give up the ship,"—be our motto; let us often contemplate, how much the prosperity of our beloved country depends on the exertions of its agricultural class; let us double our exertions at improvement, and, rely upon it, brighter days will yet await us.

Among the many cures for the evils of which we complain, the organization of agricultural societies has generally been resorted to with most confidence. Such institutions, if wisely and zealously conducted, may produce the most happy results. The mere formation of a society, and the simple gathering of its members occasionally, unless each one resolves to exert himself in the cause, and to bring with him all that he possibly can, to throw into the common treasury of information, must end in failure. But has not each one of us trusted too much to the mere formation of this society, to produce benefit, without reflecting sufficiently on his own individual duties in it, and resolving to discharge them? Which of us at its commencement, finding himself in a region confessedly capable of high improvement, and surrounded by those whom any man might delight to consider his friends and neighbors, did not prognosticate more fruits from our association, than have yet been produced? We have entered on a field, new indeed in this region, and filled with many difficulties, but happily exempted from much that poisons the peace of men in other modes of consociation. In agriculture all are brothers. Each delights in the prosperity of the rest. Each is at liberty to follow, and to profit by, the example of his neighbors. Emulation can hardly degenerate into malignant rivalry and party spirit; the baneful genius of the age has no home here. Which of us, on deriving information from a brother member here, would once think of the party in politics to which he belonged? Indeed, were there no other benefits to be derived from agricultural societies, their meetings would be desirable, that their members might occasionally be overshadowed by the benign influences of social affection. Let us resolve, then, that we will cherish these influences, yea, let us resolve that we will make a new effort to secure the best benefits from our institution. Our own interests, the honor of our country, and the good of our country, imperiously demand this effort at our hands. Should we suffer the society to die from individual apathy, some few of us may go on with efforts to improve, but it will be in rather a lonely, unsocial way; without the cheering thought that our best friends and neighbors are wishing us success, and earnestly laboring in the same cause. With ardent and united endeavors, we surely could effect something valuable, and should we fail, the consciousness of having honestly striven will afford consolation. That we have as yet done so little, instead of discouraging, should stimulate us to renewed exertion, both to ascertain the causes of failure, and to remove them.

Col. Taylor has made this remark: "the chief obstacle to the success of a society for promoting agriculture in Virginia, in my view, is the morbid

aversion to writing on that subject for publication." This was addressed to the state society, whose chief object was to operate on the public, through the medium of the press. The remark certainly cannot be applied with the same force to county societies; yet such of their members as possess information which would benefit the public, cannot justifiably withhold it. But while our members, generally, should not be expected to write for publication, I doubt much whether the chief obstacle to the success of our society for the promotion of agriculture will not be "the morbid aversion," to writing for the good of the society. In our associated capacity, we can only benefit each other, by either written or verbal information. What is communicated in writing is the most valuable, as it is commonly prepared with more care and system, and the communications being the property of the society, can be referred to whenever it is desirable. Here permit me to express my strong approbation of that regulation of our society, which requires such a communication from each member, at our annual meetings. This alone, if it be faithfully attended to, cannot fail to render our institution both interesting and useful. There is scarcely one member amongst us who does not know something unknown to some, or all, of the rest. Could we, on meeting together, hear from each member an elaborate essay on some agricultural subject, or the details of some experiment carefully conducted and reported, we should spend the day more pleasantly and profitably than we have done in some of our comparatively silent meetings. The society might also, occasionally, have the pleasure of diffusing information considered valuable, by publishing some of these communications.

But, gentlemen, I trust you will pardon the remark, when I observe that it is rather too soon to complain of a deficiency of agricultural writing, while there is so little agricultural reading among us. The "Cultivator," published in Albany, New York, is an exceedingly cheap and valuable periodical. This, I believe, is taken by a goodly number of our members. "The Farmers' Register," published in our own state, which I consider cheap at five dollars, but which may be had for half that sum, by punctually paying in advance of each volume, has on its list of subscribers the names of hardly half a dozen of our members. In these days, when it is so common for one to know and to say what other people ought to do, I suppose I shall hardly give offence, by observing that I should be highly pleased to know, that not only every member of our society, but every man who drives a plough in our commonwealth, was a subscriber for both of these works. The veteran editor of "The American Farmer," in Baltimore, has also returned to his old post, and deserves as much, at the hands of the agricultural community, as any man living. There is nothing very pleasant in the office, but I will volunteer as agent for either or all of these works, and trust I shall be able to obtain some subscribers. Most of us take political papers,

* On referring to the "conditions" of the Register, I find that I was not exactly correct in the above statement. Two new subscribers, or any old one, who will find a new one to join him, can get the work for half price, by paying in advance. See Conditions of publication.—W. S. M.

which sometimes put us in an ill humor. Agricultural papers, so far as I can speak from experience, have a powerful tendency to soothe the temper. The one may therefore be prescribed as an antidote against the poison of the other. In almost all human vocations, it is expected that some apprenticeship shall be served, or some studious preparation undergone, in order to the proper qualification of the votary. In the learned professions, much and laborious study is considered indispensable. A knowledge of architecture is necessary for complete carpentry. Even the tailors, I understand, are beginning to cut coats scientifically. Possibly that may be the reason of the great increase in their rates of charging. Agriculture, alone, may be pursued without previous preparation, and without a constant effort to improve in knowledge. Reading, alone, certainly cannot make the practical and successful farmer; but it will afford him, in an easy and expeditious manner, information which his lifetime would be too short to learn from experiment.

Among the obstacles to the success of agricultural societies, has been enumerated the perpetuity of office in the persons of the same individuals. Rotation in office is said to be the life of republics. Life is certainly an article much needed at present by our society. I can hardly conceive of any thing better calculated to infuse this, than to place, at least, the higher offices in new hands. Your president should be changed once a year. The present incumbent, while thankful for past confidence, would gladly resign the chair to another.

I feel unwilling to close this hastily prepared address, without incorporating into it something of a practical character. There was a plough introduced into this region, about ten years ago, made by Clute and Reagles of Schenectady, New York, which, for strength and durability, for facility of draught, and the beauty and thorough execution of its work, I think unequalled by any thing of the kind I have ever seen. Indeed, I consider it as far before the best ploughs of other kinds, that I have used, as these are before some ploughs that I have sometimes seen, drawn by a pair of miserable horses, and not only driven, but mended very frequently by a negro boy, whose best implements for the operation were a few rusty old crooked nails, and a stone for a hammer. The owner of this plough was certainly not in the habit of making calculations.

In conclusion, gentlemen, permit me once more to urge a renewed effort for the prosperity of our society, and to tender to each, and to all of you, my most hearty wishes for your success in agriculture, and your success in every thing.

CURING HAY.

From the American Farmer.

In an early number of the Farmers' Register, instructions are given for curing hay, which I have adopted, and pursued advantageously for several years; and, as many of your readers may not have seen that work, perhaps this communication may result in benefit to some of them.

I prepare stakes seven feet long, and two inches in diameter, sharpened at both ends—hay cut in the morning, if the weather is clear, is collected by a

horse-rake in the evening. The foundation of the cocks are made three feet in diameter, and after being raised two feet high, a stake is run through into the ground, and the cock finished by putting hay over the top of the stake, and carried up in form of a cone. The stakes handle better by being smoothed with a drawing knife, and short hay forks are the best for the work. Orchard grass, and I suppose timothy and herds-grass, put up in this way, rarely sustain injury from rain or wind, and after two days' clear weather may be mowed away with perfect safety. If urgent business on the farm requires it, I do not hesitate to leave the hay out till a convenient season.

I cut no other hay but orchard grass: most persons prefer timothy; but if orchard grass be cut as soon as it gets into full bloom, it makes excellent hay, and if the first crop be not sufficient, there is a good chance for the second. The second crop is never so good in quality as the first, and a provident farmer ought never to rely on it, but may resort to it to supply the deficiency of his first crop. After the first crop is cut, if the land be kept clear of stock, for two or three weeks, it will afford excellent grazing, and after it is eaten down, if the cattle be removed, and it has the benefit of the September rains, it makes valuable pasture till December, and sometimes till Christmas. When butter is to be made in the fall, for winter use, the cows are always turned upon my orchard grass. I have never esteemed clover valuable for hay; it is not a healthy food for horses, though it does well for cattle. Sugar beets, with rough provender, corn shucks, (wheat or oat straw,) is their best winter provision. Red clover with the aid of gypsum on exhausted lands has been found a most valuable improver: but I have been of late inclined to doubt, after lands have been well improved by lime or marl, and putrescent manures, if red clover is not generally estimated beyond its real worth. When red clover is sown on our oat or wheat fields, it is not usually grazed till the middle of October. If clover is not sown on them as soon as the grain is secured, the stock is turned in, and the fields remain a hack pasture, until ploughed for another crop. In this district of country, even under this treatment, white clover will grow on our improved lands, but red clover would generally be extinguished the first season. I have heard experienced farmers say, that the great improving property of the red clover was in the tap root. This consists in the vegetable matter it contains, and if the same quantity of vegetable matter could be imparted to the soil from any other source, the effects I should think would be equal. Some years ago, upon the change of my system of farming, I was unable to make during the year a dividing fence between my wheat and corn field, and, of course, after cutting the wheat, the field was not grazed; it had been dressed the year previous with marsh mud, and the white clover was equal to what I have seen in the fall of the year on fields sown with red clover. Red clover often fails from a defect in the seed, or the season; and, if the oats or wheat upon which it is sown be luxuriant, it is liable to be smothered before harvest. White clover is indigestible, and on improved lands rarely fails; under any circumstances, and I think under provident husbandry would afford sufficient vegetable matter to keep them in healthy action. The last two

summers I have spent some time in Pennsylvania—I conversed freely with some persons connected with the Philadelphia market, and found they esteemed white clover as more valuable for butter and beef than red.

The farmers of Maryland and Virginia have been marked for their improvidence, and among other proofs, a strong one is our dependence upon foreign states for our grass-seed. I have saved on my own farm clover and orchard grass seed, and I can say with confidence, they may thus be obtained at one-fourth of what they cost; and I confess with shame, that with this knowledge, I have generally depended upon the Baltimore market for clover seed. I warn our farmers against foreign seeds—By this means we have introduced the plantain, the St. John's wort, and the Richardson's pent; and if we add to it the Canada thistle, we shall have a heavy evil upon us. I have sown this spring but little clover seed; I purpose to keep my wheat fields, or some of them, clear of stock till late in October, and not graze them next year, till the month of May. I am very sensible that my speculation in relation to red clover, is contrary to received opinion—I do not advance it with confidence, and I desire to test it. Old Mr. Shandy thought there was nothing like a theory—I think an agricultural theory of little worth, unless its value be tested by experience.

WM. CARMICHAEL.

Wye, Queen Anne's Co., Md.
April 20, 1840.

SHEEP HUSBANDRY.

To the Editor of the Farmers' Register.

Although it can easily be demonstrated to the dullest apprehension, that no farming stock will yield greater net profit than sheep, when properly treated, yet we may venture to assert, that none are more shamefully neglected, especially in our own state. The loss among them by death, during the last winter and early spring, has been enormous; far indeed beyond any that the oldest man among us can recollect. Now, as this, I believe, has been entirely owing to a disease which, although very common, has not yet been distinguished by any technical name or physiological description, I will endeavor to point out the premonitory symptoms, for the benefit of such young farmers as may not have attended to them sufficiently, to take timely warning against their fatal consequences. The first is a striking convexity of the back, and a position of the head and neck, which give to the animal more the shape of the camel than the sheep. The next is an inward shrinking of the belly, which gives to that part an upward curvature, nearly parallel to the curve of the spine. Lastly, and when the case is nearly desperate, may be seen a drawing of the front and hinder feet towards each other, as if the poor, doomed creature, hopeless of all aid from man, was about to fall into the agonies of death. A post mortem examination, although rarely made, except by dogs and buzzards, always discloses a carcass the bones of which have nearly worn through the skin, and intestines almost as empty as the exhausted receiver of an air-pump.

Having described, as accurately as I can, what the doctors would call the diagnostics of this

hitherto nameless, but most desolating disease, I will take the liberty to call it the *venter vacuus*, or hollow belly; a malady, by the way, far more destructive to our poor sheep, than even the hollow horn is to our most wo-begone, skeleton-looking cattle. If their unfeeling masters could every now and then feel a few twinges of it, they would, at least, be taught that sympathy for their domesticated brute animals, which all men naturally feel, who are not themselves much less humane than both reason and duty require them to be.

A small portion of our farmers boldly assert that we ourselves are the sole cause of this deadly disease; and that nothing is more simple and cheap than the means by which it may be always and entirely prevented—to wit: dry shelters to protect them from bad weather; daily food of good long forage, with some grain, pease, or a due portion of such roots as they will eat; and salt sprinkled on tar, twice or thrice a week. Others, constituting, I believe, a considerable majority, would seem as strenuously to maintain, that their sheep are wiser than their masters in regard to shelters; that artificial ones make them unhealthy; and that browsing upon pine, cedar, and holly bushes, to warm their stomachs, with poverty grass and broom-straw to give them the necessary distention, is far better for them, than to save them the material trouble of catering for themselves, without which they are apt to become too lazy and plethoric.

But all badinage apart, I would most earnestly ask every man among us who owns sheep, if it is not highly important to them all to settle for ever, and as speedily as possible, this difference of opinion in regard to their proper management? The unanswerable proofs of the best practice are, and have long been, within the reach of every one who will take the trouble to examine them with a mind open to conviction. For if foreign publications on the subject should be objected to as unsuitable for us, enough and more than enough from the highest practical authority in our own country can be found to satisfy even the most skeptical. There are many of your correspondents who could exhibit these proofs, if they would only spare as much time as to write them out for your Register. But lest this method should savour too much of "book-farming" for some of our brethren, I will respectfully suggest another mode, in all cases where the communication cannot be made from the writer's own experience. For instance, when we go to our respective courts, as it is the Virginia fashion for nearly three-fourths of us to do on every court-day, business or no business, instead of spending the greater part of our time in those worse than useless political party wranglings, where all are clamoring together and none listening, let only one or two men in each county endeavor to obtain, from their friends and acquaintances, answers to the following questions:

Do you, or do you not, shelter your sheep from bad weather during winter and early spring?

Do you feed them well from November until April?

What is the average weight of their fleeces, and what the average loss of grown sheep and lambs within that period?

I presume that few would refuse to reply to such inquiries; and if their answers were arranged in a tabular form, as they might be, very concisely, such statements (unless I grossly err) would exhi-

bit so striking a difference between the results of the opposite modes of treatment, as would not only astonish even those who suppose this difference to be greatest, but would for ever banish all doubt from every mind, unless it was of that stupidly obstinate character upon which neither facts nor arguments can make any impression. I pray you, sir, to endeavor to prevail on some of your friends to give you some such statements as I have taken the liberty to suggest.

If I may judge by what I myself know, and have heard from authority in which I fully confide, the average annual loss in our state, of unsheltered and poorly fed sheep, has rarely, if ever, been less than about 15 per cent. This last season, I am confident, it has been greater; while the fleeces of all such sheep, from the time of my earliest recollection, have not averaged more than three or three and a half pounds. With this statement, which I admit to be somewhat conjectural, although not entirely so, I beg your readers to contrast the communication of Mr. L. A. M. of Tompkins county, N. Y., in the 'Albany Cultivator' for this month (April.) He states that he "commenced the last winter with 535 lambs, and that up to the 21st of February he had lost but two; both of which were mortgaged" (as he says) "to the crows before foddered season commenced." This farmer, be it remembered, both shelters and feeds his sheep with great care. To his statement I beg leave to add one which was published several years ago, in the Richmond 'Enquirer,' from a Mr. Hill, of Caroline county, Va., a gentleman of unquestionable veracity. As well as I recollect, it was made two years following; and in each year the fleeces of his sheep, to which he paid great attention, averaged upwards of six pounds. The three best flocks, by far, that I myself ever saw, were, one in Prince William, one in King George, and one in Essex. All were sheltered and well fed from the commencement of cold weather to the end of it; and the last mentioned flock was housed every night throughout the year, in an old tobacco-house, which was swept out every morning. These sheep were uncommonly fine, and might well have been compared with any that I have ever heard of in our country.

To conclude, I beg you, my good sir, to remember that this communication, like all the others which I have ever made for your paper, is sent solely *pro bono publico*, and not for self-gratification. I submit it therefore entirely to your own judgment to determine whether it can render any service or not; for I never wish to occupy even so much as a square in your Register, unless I can do some good by it; and of this you must judge rather than

Your old friend,

JAMES M. GARNETT.

Essex, April 10th, 1840.

EPIDEMIC AMONG HORSES.

From the Carolina Planter.

A disorder is prevailing extensively among horses throughout the southern states—in North Carolina, South Carolina, and Georgia, it is very general, and we understand farther west.

The symptoms are an irritability of the whole

system—with feverishness, and in some cases actual fever—slight watering or mattering about the eyes—with a cloudiness about the cornea—languor—refusal to eat—slight husky cough with slight discharge from the nostril—swelling of the legs—stiffness in the loins and legs—sometimes only one leg being affected. It attacks in some cases with colicky symptoms—or the womb becomes excited and mares cast their foals—in others inflammation of the bowels comes on. Should the catarrhal symptoms not be controlled early, swelling of the glands of the throat and neck takes place with inflammation of the windpipe and lungs—high fever and puffing of the skin—the inflammation of the eyes increases and results in blindness—the stiffness of the limbs becomes worse—spasms come on—with intense fever, and inflammation of the brain or lungs takes place, and death follows quickly.

In many of the cases rest and light feed are all that is necessary. The disease continues but three or four days. In most of the cases which have occurred in our neighborhood the irritability of the system has been checked, and the disease controlled by a single large bleeding, and for safety we recommend it in all cases. In one case, where high fever was present, and highly inflammatory symptoms, with increasing stiffness in the limbs, great swelling of the legs, and disposition to spasm, with acute pain in the bowels, we saw eight quarts of blood taken from the neck, followed by an enema of two ounces of laudanum, procure immediate relief—the symptoms returning on the following day, eight quarts more were taken away, and a repetition of the laudanum two or three times gave permanent relief.

In one fatal case which we have seen, symptoms of intense inflammation of the trachea, lungs and bowels were present—in another inflammation of the womb.

We consider the disease as catarrhal—affecting the mucous membranes and glandular system—coming on with a general irritability of the whole system, which, unless immediately removed, is followed by inflammation of the most irritable organ of the animal—in some horses there being a greater disposition to have one organ affected than another, as is noticed in man—colds producing affections of the air-tubes, bowels, or rheumatic symptoms, according to particular susceptibility of individuals to take on disease of those kinds.

While noticing the present epidemic, we would throw out a few hints on the diseases of horses in general. Most of them are *inflammatory*, and the extraordinary power of the heart and arterial system requires, that where fever is present, the most vigorous depleting measures should be used at an early period. More horses die of inflammation of the stomach and bowels than from any other disease, and most persons who have given any attention to the subject, notice how very rapidly inflammation runs its course in a horse. This renders it important to attend to symptoms immediately, and we can scarcely go wrong in bleeding a horse with symptoms of colic or bots—and giving enemas of laudanum—frequently horses are lost by waiting for the operation of a purge—in twelve or fifteen hours inflammation will run on to an uncontrollable point, while ordinarily 20 or 24 hours will be necessary for the development of the action of the cathartic; large bleedings followed by large doses

(preferable by enema) of laudanum are more successful in controlling inflammation than any other means—and we consider this as the most valuable treatment in acute cases of this kind. In chronic affections cathartics or laxatives may be used beneficially.

A long controversy has occupied farriers and gentlemen who attend much to horses on the subject of *bots*. A great many insist that they are injurious to the horse and cause death—while others are perfectly convinced that they are harmless. Writers of high reputation are arrayed on both sides, and believe, (like the knights of the shield, who viewed it from opposite sides and fought about their difference of opinion) they may both be right. During a healthy state of the stomach it is covered with a secretion of mucus, upon which it is supposed the bot feeds;—when a horse is driven too hard, or eats too much, or drinks cold water when heated, inflammation of the mucous coat of the stomach is apt to take place—the secretion is frequently checked—the stomach in health is protected by the mucus from the mechanical irritation of the bot—but now its presence on an unprotected inflamed surface increases the inflammation, and disorganization rapidly follows—ulceration effecting what the bot is supposed to make, a perforation through the coats of the stomach or bowels.

This perforation we have seen where no bots could be found—and we have seen it in horses where bots were thickly present, and here we have invariably noticed the absence of the mucus. We frequently hear of soothing mixtures of laudanum relieving *bots* (as it is called)—and also of rubbing the chest and belly with turpentine giving ease. It is by quieting inflammation or transferring it to a less vital structure, and thus relieving the primary disorder.

It is much to be regretted, that medical gentlemen pay so little attention to the diseases of this noble animal. How many valuable lives might be saved, if they did not consider it beneath the dignity of the profession to be horse doctors!

“Of all domesticated animals, the horse has the most powerful claims on the sympathy and attention of the medical practitioner. The lawyer may construct his briefs—the parson may perform his clerical duties—and the merchant may grow rich in his counting house with little assistance from the horse; but to the medical man, this spirited and intelligent animal is as essential as the knowledge which he acquires in the schools, or the medicines which he prescribes for his patients. The horse is his companion and best friend in the town and in the country. He carries him proudly through the crowded street—he conveys him safely over the midnight heath. He shares with his master in all the toils, and in many of the dangers of professional life. He is as much exposed to the elements—more indeed than the physician and surgeon—and he is not exempt from many of the diseases to which his superior is liable. To inflammation, fever, rheumatism, organic disease of the heart, liver and lungs the horse is very prone; and the study of his maladies is as necessary to the medical practitioner in a pecuniary point of view, as it is interesting in a pathological.”

—Dr. J. Johnson.

In England veterinary colleges have become frequent, and the later publications of the British

press show the estimation in which this subject is held. "The Society for the diffusion of useful knowledge" has published the best "history of the horse in all its varieties and uses," and we recommend it to the perusal of all medical practitioners and gentlemen who value a good horse.

So long as a horse is healthy and able to work he is highly esteemed, but as soon as he becomes diseased we are very apt to order him to "go to grass," or we think ourselves lucky to get some one else to take him off our hands. If a faithful servant were to become sick, and we give him away to get rid of the trouble of keeping him, we should be considered unjustifiable and cruel, but with a dumb beast of a horse there is nothing wrong in it and we dismiss him from our thoughts as we do from our presence. This is a common practice, but we know of many exceptions, and take pleasure in stating the fact. The improving spirit of attention to fine stock is correcting the abuse elsewhere. We trust that it will do so with us.

ON THE CULTIVATION OF CORN. PULLING FODDER. MORE ABOUT BADEN CORN. APPLE AND PEAR CUTTINGS. MULTICAULIS. DEEP PLOUGHING.

For the Farmers' Register.

South Carolina, April 10th, 1840.

Cultivation of corn.—Being opposed to the absurd doctrine, that by cutting or breaking the roots of a plant you thereby promote its growth, and believing, that in the cultivation of the corn crop too many deep ploughings are usually given it, I have felt anxious to make an experiment in a different mode of culture, but until the last year have, by the influence of custom, been deterred from attempting it. On reading the first article in the first number of the 7th vol. of the Register, written by Mr. W. P. Taylor, I was, however, happily relieved; and so well was I satisfied with his mode of culture, that I at once resolved to risk, not only one field, but my whole (home) crop on it.

Advocating the practice of deep covering, though not so deep as recommended by Dr. Hardin, I will here remark, that my corn, on all suitable ground, was covered by ridging on it with the twisted shovel, and afterwards (in six or eight days) the ridge was lightly cut off with a board fixed on the foot of the plough stock in the place of the plough.

My first furrows were run, after the corn came up, in those on each side of it, (which had been made by covering it, and partly refilled in cutting off the ridge,) with the twisted shovel, throwing from the corn; and in the after culture I pursued Mr. Taylor's practice throughout, using the side harrow (with three teeth, flattened, pointed, and bent at the lower end, to cause them to enter the ground) in the crop work, in place of his cultivator; and the twisted shovel plough to bed up with, instead of his bar-share.

In my fresh fields, on which the logs have not yet decayed, (for I have not directed a log heap to be made or burnt in the last two years,) the plough and harrow were run alternately in the same direction; in which direction all the logs, after having been cut in suitable lengths, are turned, to prevent their being in the way of the plough, or occupying any part of the row, to the exclusion of

the corn, it being planted at regular and suitable intervals, according to the strength of the land, though not on cross furrows, as is the practice on my old fields. To enable small hands to drop corn at regular distances, when the land is no checked off, I have caused a number of wooden compasses, or dividers, to be made so as to subdivide different distances, say from eighteen to forty inches, and from two to three feet high. With one of these a hand can drop almost as fast as he can walk; having his basket of seed swung to the neck, taking out with one hand, whilst with the other he is turning his dividers, which, when turned, marks the spot for dropping the grain.

Now, Mr. Editor, with my grateful acknowledgments to Mr. Taylor and yourself, for the valuable information I have derived from him, through the Register, I take much pleasure in saying, that, notwithstanding the very unfavorable crop of 1839, I have, in my corn crop, fully realized my most sanguine expectations. My corn "fired" less than I ever had it to do before whilst the fodder on many farms in my neighborhood was remarkably "burnt" before the usual time of sowing it.

My manager (an old man) says he never tended a crop with so much ease in his life; that he thinks he could cultivate half as much more land to the plough, in this as in the usual manner of cultivating a crop. And so well am I satisfied with the result, myself, I have directed my overseers at their different farms, on which I made last year not less than *fifteen hundred barrels* of corn, to cultivate all in the same way the present year.

I attribute my success mainly to two causes. First, I was enabled rapidly, and frequently to pass over my crop, and consequently, to keep the surface open, to promote the absorption of atmospheric moisture, which, at night, and in the driest seasons, is more abundant than generally supposed; as well as to assist, by lightening the surface soil, the transpiration through it of the water of the sub-soil, which, being more forcibly acted upon by the greater permeability of the earth, in this loose, porous, and lightened condition, to the rays of heat, afford a considerable resource of humidity.* And secondly, to the comparative little injury done the roots of the corn in the manner of its culture; the plough gradually forming a bed in one direction, for the roots to penetrate in their progress towards the centre of the spaces, whilst the superficial work of the harrow, in the other, kept down crop grass and weeds, and at the same time cut no roots but such as run very shallow.

It may be that cutting the roots of corn has a tendency to "multiply spongioles at the ends of the cut roots next the stalks, more than sufficient to compensate for the loss of the extreme feeders," as suggested by Mr. Garnett, (vol. 7, p. 4, Farmers' Register,) whose views generally I much admire, and whose writings I have had the pleasure of reading occasionally, for the last ten years. But if it were possible to avoid it, I would never cut the root of any plant in its culture.

Pulling fodder.—On this subject, I have no doubt, I am with many others, in preaching one thing and practising another; for I feel well convinced that much injury is done to corn in taking

* See Dr. Muse's statement, &c., vol. vii., p. 17, Farmers' Register.

off the blades, at the time when most persons do it, and as it is usually done. But as we are compelled to have something of the kind for our horses, and as it is a very common belief, (which I much doubt from small experiments of mine,) that we cannot raise clover and foreign grasses in this state for hay, we are forced to do that, that many of us believe is an injury to our corn.

For the benefit of those not averse to passing over the fields more than *once*, (and this is an objection with some of my neighbors,) I will state, that of late I have been in the practice of going over the whole of my corn crop *twice*, and very often *three times* over parts of it, before the whole of my blades were pulled. My orders to my hands are not to take a blade from any stalk the ear on which is not very perceptibly changed in color. And even then, up to the ear only, unless its extreme sheath is partly or quite dry, in which latter case, all are to be taken from the stalk. In this way I am confident I have done much less injury to my corn than is done in the usual manner of taking all before us. True it is, I have to pass through my crop two or three times; yet it is not so unpleasant after all, unless the corn is so sorry that I might wish to keep altogether out of sight of it. Besides, I get *more and better* fodder by so doing; for if we wait till all the corn is ripe enough, much of the fodder will have dried up and become worthless. On the contrary, if we go to work too soon, then the corn is the sufferer; and most of the earliest fodder in the last fields we reach will be lost: the time of taking it being prolonged by taking all before us.

I have stated above I doubted the commonly received opinion that we cannot raise *foreign grass* in this state. Admit it to be true, however. If we were to clear up the many worse than useless brush and creek swamps, on most of our farms, they would supply a much better article of food in all native grasses, than the *best* of our corn blades, say nothing about the *worst*.

Baden corn.—I planted about two acres of Baden corn last spring, and although I did not measure the product, it certainly yielded at least a third more than any other variety in the same field. The land was thin, and not manured since 1838, when it was in cotton. I have planted the present year a field of it, selected from those stalks having the most ears; and of another variety (a mixture of the Baldwin with the common flint, having a very deep grain on a small cob, taken from stalks having two or more ears,) in alternate rows, in hopes of improving the grain of the Baden corn, which is too short for the size of the cob, and at the same time preserving its prolific character. My seed was obtained from a gentleman in Georgia, who had received the previous year a part of a barrel, sent by the Hon. Jesse Cleveland, from Washington city, to some of his constituents in De Kalb county.

Apple and pear cuttings.—To such persons as may feel disposed to try the experiment, and be humbugged, as I have been, by those that have asserted, that apple and pear cuttings would grow, if treated and planted as multicaulis cuttings, I would say, apply your labor to some other occupation. For, out of one hundred cut, waxed and planted, *secundum artem*, last spring, not a single eye of either succeeded. I had not much faith, I must acknowledge; for I had, some

years since, tried sticking a cutting in an Irish potato, and the result was, that the potato grew, but the cutting died.

Multicaulis.—I have planted, the present season, about three thousand multicaulis cuttings, preparatory to commencing the silk making business on a small scale, another year. Many of my friends laugh at me, and say, "it is all humbuggery." A friend of mine writes me from Georgia, "I think, from your letters, that your symptoms of silk fever are '*rather alarming*.' I am of the opinion, however, that a few doses of multicaulis, worked off with silk-worm eggs, will restore you to health." Probably it may, friend B***; but I very much regret I did not take the multicaulis fever in 1832, when G. B. Smith, esq., offered to furnish twenty trees to any one wishing to purchase, at *one dollar per tree*. (See American Farmer, p. 81.) Then, if I had taken the "fever," and repeated the dose, it would certainly have proved the grand *panacea* to my pecuniary health. It would have enabled me to contribute liberally, which I should have done most cheerfully, to the Smith Fund; and thereby furnishing a *solid* token of respect, to one much deserving it.

Deep ploughing.—I should have stated in its proper place, that I am not opposed to deep breaking of land; on the contrary, I care not how deep the breaking is done, (even in the thinnest soils,) provided the soil be kept on top,* and for that purpose, I once constructed a plough with two coulters, to run in rear of the mould-board, and set as deep as I desired to break the subsoil, without turning it up and mixing it with the soil; the plough at the same time turning to the full depth of the soil. It answered a very good purpose in old land, that was clear of roots and stones; but required two strong horses to pull it, and laborious work for the ploughman. In new and rough lands, it could not be used to any advantage. It was consequently laid aside; and I now prefer, in thin soils, running the broad point coulter in the same furrow of a light, one-horse, turning plough, in which way the subsoil may be well broken without turning it up, in any kind of land.

In conclusion, sir, if I could write better, I would write oftener; but my great desire to promote the interest of that most useful, and much neglected class of the community, the agriculturists, will, I trust, be a sufficient apology, for intruding my bungling production on yourself and your very respectable class of readers. It cannot be expected, I know, that every farmer should be an elegant writer. And yet most of them may, in some sort of way, communicate their views, and the results of their experiments, so as to be understood, and possibly benefit others. S.

MODERN IMPROVEMENTS IN EUROPE IN SILK-CULTURE.

From the National Intelligencer.

The introduction of improvements in the silk culture will be much more readily effected among an educated and intelligent people, having no preju-

* See Gideon B. Davis's Essay, American Farmer, vol. xiii., p. 369. I once ruined a field by turning deep, according to the directions of Arator.

dices in favor of old modes, and every thing to learn anew, than among those whose uneducated minds have, by long habit, become wedded to particular usages. In the central and northern parts of France, the disadvantages of climate have been in a great degree overcome by art. The adoption of improvements in the construction of cocooneries, so as to insure warmth and that free ventilation so indispensable, have enabled them to obtain in the vicinity of Paris three times the weight of cocoons from a given quantity of eggs that is the average produce in the southern departments, the consumption of leaves being at the same time fifty per cent. less. At the model establishment at Bergeries de Senart, near Paris, under the direction of M. Camille Beauvais, the results obtained have indeed surpassed all anticipations. The silk is remarkable for its lustre and strength, and commands an extra price. With 1,000 kilogrammes, or one ton (2,240 lbs.) of leaves not sorted or picked, M. Beauvais has produced 90 kilogrammes, or about 200 pounds of cocoons. The mulberry plantations at Bergeries occupy about 35 acres of ground, and when they get into full bearing are expected to supply sufficient foliage to rear the product of at least one hundred ounces of eggs. M. Beauvais preserves his silk-worm eggs not only to any period of the ensuing year most convenient to have them hatched, but even till the year following this, in which last case the eggs have been found to hatch perfectly well and go through all their stages with regularity and vigor.

By raising the temperature and increasing the number of repasts, he accomplishes his feedings in from twenty-two to twenty-four days, thus saving much valuable time and labor which may be devoted to trimming mulberry trees and other objects connected with the business. The rapidity of the rearing has not been found to impair the value of the silk. M. Beauvais has exerted himself to diffuse all the information upon the subject which his opportunities enabled him to do. His cocoonery is open to all visitors, and, during two months of the rearing season, he receives gratuitously those who place themselves under him for the benefit of his observations and practical instruction.

Among the scientific individuals who have devoted special attention to the silk culture is M. Robinet, member of the Royal Academy of Medicine. He is director of the government model cocoonery at Poitiers, where he has distinguished himself by the success of his labors. He gives gratuitous lectures upon the silk culture every season at Paris. The course begins in February, and consists of two lectures a week, delivered on Wednesday and Saturday. Immense advantages must result from the lectures of Robinet, and the practical course of instruction by Beauvais.

In a recent report made by Bourdon to the French Minister of agriculture and commerce,* he gives a statement of the success obtained in cocooneries where the new modes of heating and ventilating have been adopted, to a greater or less extent, compared, in many instances, with results attendant upon the ordinary plans. He first presents the experience of the model cocooneries established in the departments of Drome and Vaucluse.

"In the first," says he, "at Faventines, near

Valence, the beautiful race of silk-worms called white *Sina*, obtained from M. Beauvais, yielded a product of 78 kilogrammes (or about 171 lbs.) of cocoons, with a consumption of 1,000 kilogrammes (or about one ton of 2,240 lbs.) of leaves. Two races of worms, producing yellow cocoons, one from Piedmont, the other from Ardeche, gave 165 lbs. and 158 lbs. of cocoons for the same quantity of leaves.

"In the second establishment, situated upon the grounds of the Marquis of Balincourt, near Palud, (Vaucluse,) upon the banks of the Rhone, in a locality where the mulberry leaves are very watery and but little nutritious, M. Peltzer has obtained 132 lbs. of cocoons to the ton of leaves. He operated with the eggs of the white *Sina*, obtained under the superintendence of M. Aubert, in the Royal Domain of Neuilly, which eggs the king, in his enlightened zeal for the success of the silk culture, had requested to be placed at the disposal of the Marquis of Balincourt."

"The produce of the other cocooneries of this proprietor, managed upon the common plan, do not yield more than from 44 lbs. to 56 lbs. cocoons to the ton of leaves."

With some difference in the proportions of leaves consumed, similar crops of cocoons appear to have been procured by nearly all the feeders who have availed themselves of the salutary influences to be derived from a uniform temperature and constant renewal of the air. Thus M. Thannron, member of the Agricultural Society of Drome, obtained on his estate, near Valence, 168 lbs. of cocoons to the ton of leaves.

M. Robert, at Saint Tulle, near Monosque, department of Lower Alps, obtained the following results: The product of eight ounces of eggs consumed 18,032 lbs. of leaves, and yielded 915 lbs. of cocoons of excellent quality. It must be observed that M. Robert only gave his worms the advantage of the new mode of ventilation after they had passed the third moulting. Not having net hurdles, his worms were fed on temporary board shelves.

Upon M. Robert's estate, the average product of feedings made by his tenants, who pursued the old methods, was only about 61 lbs. of cocoons to the ounce of eggs.

M. Mazade, jr. at Anduze, (Gard,) in operating upon 12 ounces of eggs, obtained 605 kilogrammes (about 1,331 lbs.) of fine cocoons with a consumption of 9,103 kilogrammes (about 20,000 lbs.) of leaves: that is to say, about 147 lbs. of cocoons for every ton of leaves consumed.

The same amount of foliage afforded him only, about 88 lbs. of cocoons in his other apartments, which, though superintended by himself, had not the advantages of that ventilation and artificial temperature, together with the perfect equality in the several stages and frequency of repasts maintained in the system of Beauvais and D'Arcet. The agricultural commission of Alais awarded a gold medal to M. Mazade, with the expression of its thanks, for the fine example set to his district.

The temperature maintained in the cocoonery during the experimental feeding of M. Mazade ranged between 77 deg. and 73 deg. Fah't. whilst the degrees of moisture ascertained by De Saussure's hygrometer varied from 65 deg. to 85 deg.

We learn from M. Mazade the highly interest-

ing fact that the whole amount of labor required in this rearing of the produce of 12 ounces of silk-worm eggs consisted of 111 days' work, of which those of men were 46, and those of women 65.

Now supposing the wages the same as those set down in Bourdon's calculations, namely, 40 cents per day for men and 25 cents for women, then will the whole expenses of labor amount to \$34 65, which is much below the expense of rearing estimated by Bourdon, namely, \$53 for feeding the produce of only ten ounces of eggs.

The 1,331 lbs. of cocoons, sold at 35 cents per lb. would bring \$465 85, which sum, to those growing their own trees, would afford a handsome profit, even after allowing 50 or 100 per cent. additional for expense of labor, and saying nothing of premiums or state bounties. Supposing the cocoons reeled off into good raw silk, and sold at \$5 per lb. the proceeds of the crop would be increased to nearly \$700.

In estimating the costs of raising silk in most parts of the United States, the main items are for suitable buildings, fixtures, and labor, the charge for land being a very insignificant item, as the following facts will sufficiently prove:

The Rev. D. V. McLean, of New Jersey, actually raised last year upon one-fourth of an acre 2576 lbs. of leaves from multicaulis trees produced by roots and cuttings planted in April of the same year, with which leaves he fed worms enough to enable him to make twelve pounds of reeled silk. He states that his ground was by no means rich, and the trees small, though pretty close together. At this rate, more than 20,000 lbs. of foliage can be obtained from two acres of multicaulis trees, the first year of planting. Here is a fact of immense importance to us in the United States, and, for the clear demonstration of which to say nothing of other services he has rendered his country, we feel ourselves under great obligations to Mr. McLean. The multicaulis, and, indeed, any other variety of mulberry, will afford at least three times as much foliage the second year as the first.

The proportion of leaves consumed in M. Mazade's feeding, to the cocoons produced, is about 15 to 1; the same which Dandolo gives as the average consumption and product according to his experience. We have seen, however, that M. Beauvais has obtained, at Bergeries, near Paris, 1 lb. of cocoons to 10 lbs. of leaves, which is a saving of 50 per cent. both in foliage and the labor of gathering and distributing.

One of the most remarkable instances of success reported by M. Bourdon is that obtained by M. Planet, vice president of the tribunal of Valence, and member of the Agricultural Society. For many years his cocooneries had been almost entirely swept by the *muscardine*. After the adoption of the new system of ventilation, his worms not only escaped the devastating disease, but afforded him 350 kilogrammes (770 lbs.) of cocoons from six ounces of eggs, being at the rate of about 130 lbs. of cocoons to the ounce. The results obtained in two rearings, conducted in the two model cocooneries of Drome and Vaucluse, afford strong evidences of the happy influences spread by the system of Beauvais. Managed upon precisely the same principles, and under similar circumstances, as regards the interior of the cocoonery, notwithstanding the difference in climate,

they progressed with perfect uniformity. Each age had exactly the same duration—that is to say, five days from the first, including the 36 hours of moulting, or sleep; three days for the second; five for the third; five for the fourth; and six for the fifth. The temperature during the whole time of the rearings was maintained, as nearly as possible, between 76 and 80 deg. Fahrenheit. The degrees of moisture varied from 78 to 85 deg. of De Saussure's hygrometer. Twelve repasts per day were given in the first and second ages, eight during the third and fourth, and six in the fifth age.

The examples here cited will suffice to show the advantages derived from the new system of rearing silk-worms, introduced into France by Beauvais and Darcet, founded chiefly upon the combined influences of a high and uniform temperature with increased frequency of repasts, and constant renewal of the air.

"It is true," (M. Bourdon observes in relation to this system,) "that the cares and attentions are multiplied; that very frequent removals of the litter are absolutely necessary; that the least neglect in the distribution of the repasts cannot fail to be attended with serious consequences. But, on the other hand, the duration of the attentions and anxious solitudes of the feeder is abridged, the ill effects of changes in the weather diminished, the means of producing refrigeration—always more difficult to apply than those of procuring warmth—are provided. The rearings may be finished before the coming on of the *touffes*, especially in late seasons. Finally, the tree, being sooner stripped of its leaves, does not suffer so much as when these are gathered later."

It is very evident that, as this forcing system of rearing admits of no deficiency of food, and no delays in its distribution, a sufficiency of manual labor must be at command, in order to carry it out thoroughly. We will introduce a very short description of the model establishment at Bergeries, near Paris, which will give some distinct notions of the means by which the objects contemplated are accomplished.

The apartment destined to the rearing of worms is 72 feet (French) in length, by 22 wide, and 14 high. The furnaces and air chambers, for heating or cooling the air, are outside, and the warm or cool air is introduced at pleasure through pipes or flues, constructed of wood, and placed in or rather under the floor. These flues are pierced with holes at suitable distances, being made larger and larger in arithmetical proportion as they recede from the air chamber. Corresponding flues and holes are placed above, all of which unite in one general box communicating with a very large and high chimney, from which the communication can be cut off at pleasure by means of a valve or damper.

Before entering the chimney the upper flues lead into a box or kind of main flue, above which is another box provided with a ventilating fan or wheel, which forces, or, as it were, pumps the air from the cocoonery, when the draught of the chimney will not keep up a circulation sufficiently active. Before setting the ventilating wheel in motion, the valve in the main flue leading into the chimney is of course closed. The air drawn out of the cocoonery by the wheel is forced into the garret. Too much warmth, or the occurrence of a bad odor in the apartment, is the usual signal to get the ventilating wheel in motion.

The great efficiency of this plan of ventilating has been demonstrated by experiments, in which the cocoonery having been filled with smoke has been cleared by the draught of the chimney alone in about two hours, and by cutting off the communication with the chimney and turning the ventilating wheel at the rate of 70 revolutions a minute, the smoke has been drawn out in 32 minutes, or about one-fourth the time required by the chimney.

In the 'American Silk Grower,' recently published monthly by W. Cheney & Brothers, at Burlington, New Jersey, there is a detailed description, with cuts, showing the arrangement of the building erected by the government architect, for Count Grimaudet, on his estate at Villemomble, near Paris.* The scale of this building may be imagined from the fact that it is calculated to accommodate in one season the product of 80 ounces of eggs in each of its two wings. Its entire length is about 160 feet, by 60 wide. It is divided in the middle by a partition, forming two wings, each of which is furnished with an air chamber and all the appliances of a separate establishment. A basement story is appropriated to the drying of leaves, when this is requisite, and after the feeding is done, it is used as a filature, the reeling being conducted upon the system of Genesoul. The edifice is much more costly than would have been necessary for the mere purposes of a cocoonery. It stands in the midst of a beautiful park in the immediate vicinity of the chateau, and the Count has indulged himself in the display of considerable architectural taste. The proportions are harmonious, and the ventilating chimneys rendered quite ornamental. The attached mulberry plantations cover some 30 or 40 acres.

In addition to this splendid cocoonery, erected at Villemomble, in 1835, Count Grimaudet established another near Versailles, in 1836. This last, though not near so large as the one just referred to, is nevertheless a fine establishment, being 120 feet long, 27 wide, and 18 high; within, estimated to accommodate the product of 120 ounces of silk-worm eggs.

Should the rearings at Villemomble meet with the same success that has attended the new system in other places, Count Grimaudet will find his beautiful and noble establishment a source of great profit, notwithstanding the extra expense lavished upon it. Should he, for example, obtain at the rate of 150 lbs. of cocoons to the ounce of eggs, his 160 ounces would yield him 24,000 lbs. of cocoons. These at 35 cents per pound would be worth \$8,400; from which sum deduct for labor at the rate of \$53 dollars for every 10 ounces, as estimated by Bourdon, and the net profit left would be \$7,550, a revenue which would richly compensate for a heavy investment in mulberry plantations, buildings, and fixtures. Reeling the silk would considerably enhance the profits, as the raw silk would doubtless sell for more than \$10,000 after deducting the expenses of reeling.

In thus introducing to the attention of the American reader the new system of rearing silk-worms adopted in France, especially in the central parts, we do not wish to be understood as recommending its general employment here. Its great advantages in most parts of Europe cannot be doubted; for

there, as we have shown, they have obstacles of climate to contend against that do not exist to any thing like the same extent in the United States. An examination of some of the details relating to the contrivances and experience in that country, where so much intelligence is now concentrated with a view to improve the silk culture, cannot fail to afford, either directly or incidentally, a great deal of highly valuable information. We are fully of the opinion that silk-worms always succeed best where they are kept at a pretty uniform temperature, provided the proper ventilation be preserved. Even in the fine climate of our southern and middle states, artificial warmth is necessary at times during the period of rearing, especially of mornings and evenings. For this purpose it will always be advisable to have one or more stoves placed on the northern or western side of a cocoonery, in which fire can be made as occasion may require. Or, what is a still better arrangement, a furnace and air-chamber in the basement or cellar, with flues running under the floor perforated with apertures for admission of the warm air. This may be effected with comparatively little expense, and without that multitude of holes recommended by D'Arcet. For an apartment 25 or 30 feet in length, eight or ten holes of moderate size will perhaps suffice. Instead of flues above to draw off the air, this, when too warm or vitiated, may be allowed to rise, as it naturally will, into the garret, and then escape through ventilators in the roof. Cocooneries having two stories are to be preferred.

As we regard the system of rearing pursued in Lombardy on the estates of Count Reina better adapted to the nature of our climate and other circumstances than any other with which we are acquainted, we shall give the description of it furnished by M. Puvis, a most intelligent French author, to whom we are much indebted for information upon this and several other topics connected with our subject.*

The estates of Count Reina are situated about two miles from the town of Come, in Lombardy, and, as before observed, the several cocooneries situated upon them are nearly all superintended by his daughters in person. Hence, the course pursued is called the system of the Misses Reina.

When the time arrives to hatch the eggs, they put them into small linen bags, and place these between two mattresses that are not slept upon. These are visited twice daily for the purpose of admitting the air to the eggs, and the hatching usually begins in eight or ten days. After the eggs have hatched, they are carried into the cocoonery, emptied into a small basket lined with linen, with a piece of tulle placed over the top, or, instead of this, a piece of paper perforated with holes about large enough to allow grains of wheat to pass through. Over this tulle, or perforated paper, young shoots of mulberry are placed, which soon become covered with worms. The young worms are kept near a stove, and a temperature of at least 77° Fahrenheit is maintained in the cocoonery, which should never be placed in a situation exposed to moisture.

* Lettres sur l'Education des Vers a Soi, par M. A. Puvis, Ancien Deputé, Ancien Officier d'Artillerie, Membre de la Legion d'Honneur, President de la Société Royale d'Emulation et d'Agriculture de l'Ain., etc. etc.

* And also in the Farmers' Register, p. 77, vol. viii.

During the two first ages, the worms receive ten repasts a day of fresh leaves chopped very fine. During the third and fourth ages, the number of repasts are reduced to eight per day, and to five during the fifth age.

The leaves are cut less fine during the third age, whilst in the fourth they are merely sorted or freed from the stems and fruit. The quantity given each time is sufficient to cover the worms with leaves.

The worms are one day without eating in the first moulting, two days during the second, nearly three at the third, and a little longer at the fourth. Some leaves are, however, given at the commencement of the moultings, for the support of such worms as are not sick.

The space which the *Misses Reina* allow the worms during the last age is much greater than that recommended by authors who have treated upon the subject, namely, 570 square feet (652 English feet) of shelves or hurdles for the ounce of eggs yielding 75 kilogrammes, or 168 lbs. of cocoons. This is more than double the room recommended by Dandolo, namely 170 worms to the square foot, or 183 French square feet (209 English) to 31,200 worms, producing 121 pounds (French) of cocoons. The space allowed ought to be so much the greater as the means of ventilation are less perfect, the warmth greater, and the removal of litter less frequent. As a mean, M. Puvis recommends 350 square feet (French) to the ounce of eggs.

The temperature of the cocoonery is at least 77 degrees Fahrenheit in the first age, but is reduced rather more than one degree each age, so that, in the third moulting, the temperature is about 73 degrees. At this time they begin to open the windows occasionally. During the warmest hours of the day, the ventilating holes are partially opened, and, if the weather be warm enough, no fire is made in the stove. During the fourth age, all the ventilating passages are opened; at the time of the fourth moulting, the windows are kept either entirely, or at least, half open; in the fifth age, and especially at the period of mounting to spin, all the windows and ventilating passages are left open night and day, *let the weather be what it may*, and, should the cocoonery not be capable of the freest ventilation, the worms must, if possible, be conveyed to some other and larger apartment. Where the whole of the worms cannot be removed, a part of them must be taken away.

By pursuing this plan, the *Misses Reina* obtain average crops of 75 kilogrammes of cocoons (168 pounds) to the ounce of eggs, and what makes the result more extraordinary, with a consumption of leaves equal to only 10 pounds to 1 pound of cocoons, being nearly equal to the greatest product obtained by Beauvais in his experimental feedings, aided by all the improvements and expensive appliances of the new forcing system of rearing.

This success is rendered the more remarkable by the fact that it extends throughout all the colonies upon Count Reina's estate and has been furnished every year for many years past, embracing good and bad seasons. M. Puvis thinks it is mainly to be attributed to the frequency of the repasts given in the first ages, to the large space allowed the worms, to the active ventilation kept up from the third age, and, perhaps, to the gradual diminution of the temperature of the apartment,

especially during the fifth age and period of mounting to spin. The climate has, doubtless, some influence, but the system contributes still more, since the *Misses Reina* obtained a larger product than any of their neighbors.

This description of the admirable system pursued by the *Misses Reina* induces us to believe that the cocooneries of the count are of moderate dimensions, and dispersed over his plantation so as to form so many colonies. It is with silk-worms as with sheep or other animals, which, when too much crowded, always suffer from disease. The vital importance of ventilation, especially in the last age of the worms, is strikingly shown in the plan pursued by the *Misses Reina*. The object of placing the eggs between mattresses may be intended to keep them at a uniform temperature both day and night. The observation that the mattresses are not to be slept on at the time, refers to a custom in the south of Europe, particularly among the peasantry, of lying in bed with their silk-worm eggs for several days, to assist in hatching them. Others carry the eggs in their bosoms or pockets, with the same intention of subjecting them to the heat of their persons.

Whether any particular advantages are derived from the mode of hatching pursued by the *Misses Reina* may be a question; but, as it is extremely simple, and the results obtained from their whole system of management have proved so highly advantageous, it may not be advisable to omit any direction which can be complied with conveniently. We would lay particular stress upon the points of increased space allowed to the rooms, and the greatest possible ventilation in the fifth and last age, when the solid, humid, and gaseous exudations from the worms, as well as the gaseous emanations from the fermenting leaves and litter, are most abundant and extremely noxious to the insects. These emanations must be allowed to escape, at all hazards; and to close the windows and ventilating passages of a cocoonery during the last age, with the view of protecting the worms against a storm, would be, in the language of the fable, to shut up the wolf in the fold.

FRANKLIN.

From the Maine Farmer.

AGRICULTURAL PAPERS, &c.

[The writer of the following article has made a discovery which, however new to him, and scarcely suspected by the great body of the agricultural public, is no secret to any agricultural editor, whether he be one of those who share in the offence charged by the writer, or one clear of all such illegitimate gains, made indirectly from the entire confidence placed by the public in his editorial judgment, patriotism, and disinterested and fair dealing. We are pleased to see this first effort, however limited in its range and application, made to oppose this extended and still growing evil. It would indeed be well for the much humbugged and always duped public, if the whole system of editorial trading (and not omitting the

very important branch of buying and selling puffs) could be laid naked and made manifest to all.—
ED. F. R.]

Mr. Holmes:—At this time, when so many "new improvements" in the arts and sciences, as well as almost every branch of human industry, are put forth to the public, under the most imposing titles and captivating language, I think it will not be out of reason to throw out a few hints to my brother farmers, to be on their guard, and not suffer themselves to be imposed upon, by interested persons, in the sale of some of those "new improvements," which are almost daily, or at least every week, brought before the public—however specious may be their pretensions to the patronage of the community. For, sir, it is a fact, which cannot be controverted, and the more reflecting part of the community already perceive it, that we live in a day of humbuggery, or in other words, at a time when there are men, who are determined to take the advantage of the more ignorant, by ushering to their notice this thing, or the other, as "a great" or "decided improvement" in this or that branch of business, or something which is "new" or "well deserving attention." *This is done in various ways, but in none, perhaps, more successfully, or in which we farmers are made to feel so sensibly, as through the medium of some of the agricultural journals of the day, and especially those which are published by persons who are directly interested in the sale of those very articles or "improvements" which are advertised, and to which our "particular attention is invited" by the editor, under his EDITORIAL HEAD.*

You are aware, sir, that there are many journals published, with the imposing title of some "agricultural" term, in order to disseminate the advertisements of the proprietors, for the sale of these articles, or improvements, kept in their "agricultural establishments, seed stores," or "warehouses," and their great usefulness is thus trumpeted forth every week to the community. This is also done too, by persons who are sometimes hired at a certain price per week, or year, to conduct these journals, and I am sorry to state that rich persons are found, too, who are willing thus to lend their talents, and to prostitute their dignity, to aid in this species of deception, whereby we ignorant farmers are deceived, and thus deprived of some portion of our hard earnings. Indeed, we are made the dupes of this kind of people, by first subscribing and paying for their paper, thereby furnishing them with the very means to deceive us, and are led to purchase some of their "new improvements," or "valuable seeds," and finding that we have been cheated, after it is too late to apply the remedy, and in our turn, by thus lending our patronage, help to deceive others.

Not that I would be understood as discouraging the circulation of *agricultural journals* in the least, for I most earnestly wish that they might be increased tenfold or more. But I would advise every farmer to use the utmost caution, and subscribe for those papers, and those only, which have no connexion whatever with any "agricultural ware-house," "seed establishments," or the like, unless they are under the control of such persons whose standing in society is such as to be a sufficient guaranty to place them above suspicion, in resorting to any of those "artifices" or "tricks

of trade," which are so boldly pursued by some.

If, sir, we should adopt this course, we should soon drive these worse than useless publications from circulating amongst us, not but that they may contain something that is valuable, but they are at the same time loaded with articles, in the shape of "editorial," "communications," or "advertisements," calculated to gull the public and deceive the community. And by lending them our patronage, we encourage them to pursue this species of deception, until by bitter experience we find we have been imposed upon, when, perhaps, our minds have become prejudiced, not only against this, but every other agricultural journal. We then discontinue that paper, and refuse, or neglect to subscribe for any other, thereby depriving ourselves of the benefits to be derived from well-conducted journals of this description, and we do not stop here, but suffer our prejudices to extend to every improvement, without in any way testing its advantages—thereby depriving ourselves of that kind of information and knowledge, which it is all important that we should have, in order to carry on our business to advantage.

In order to remedy this evil, I wish to exhort all my brother farmers not to subscribe for, or in any way lend assistance to, journals of this description, but to patronize such, and such only, as are edited by a person who is acquainted with the business of practical agriculture, and one too who is unwilling to prostitute his talents for "hire" to conduct a weekly paper, and lend the credit of his name to a journal, which is published by those who are directly interested, in the vending of all articles which are advertised by them, as well as praised by the editor, who is paid a stipulated price for doing it.

We want a paper published by a person who is not a proprietor or copartner in any "agricultural warehouse," "seed store," or "deposite of farmers' seeds and tools," and edited by a gentleman, who will not consent to lend the sanction of his name to puff any article whatever, any further than its real merit and intrinsic value will warrant. Such papers there are published, and to such we ought to afford support. They are the vehicles which serve to convey to us a vast fund of information, and will pay us all they cost fourfold.

Garland, March 5, 1840. ASA BARTON.

From the Library of Useful Knowledge.

A GLOUCESTERSHIRE VALE-FARM.

Description of the Vale of Gloucester and Berkeley.

Between the Cotswold hills and the river Severn, there is a tract of low country, extending in length from Thornbury to Evesham, a distance of about forty miles; and of various breadths, from four to about ten miles. The surface of this district slopes gradually from the foot of the Cotswold hills to the Severn; and although its uniformity is considerably broken by several detached hills of the oolitic formation, separated from the main body; yet, in its general aspect, it may be said to be a level district. It is statistically divided into the vale of Gloucester and the vale of Berkeley.

The subsoil of this district is the blue lias-clay formation. Its course through this county is very

irregular and intricate, being bounded on one side by the waving line of the Cotswold hills, following the oolite up the valleys in all their windings; and being broken on the other by deposits of calcareous gravel.

The soil, on this formation, which is formed of clay with a mixture of vegetable matter in a decaying state, is very various, and is more or less productive according to the quantity of dead and decaying vegetable matter it contains. In some places, where it has been long pastured, and where a considerable portion of vegetable matter is mixed with it, it produces the richest pasture; but on other parts, it is very tenacious, poor, cold and sterile; and better adapted for pasture to young stock than for dairy cows or tillage.

The whole of this district being inclosed with hedges, having a great quantity of hedge-row timber in them, it has the appearance of being thickly wooded, as, indeed, it is in many places. The climate is not so early as might be expected, owing, we believe, to its clayey subsoil. Harvest is about as early on the Cotswold hills as in the vale, although they are at least six hundred feet above it. Dairy-farming is the universal pursuit in the vale.

Description of the farm.

The farm of Frocester Court contains between four hundred and five hundred acres, about four hundred of which are in old pasture. It lies in the vale of Berkeley, at the foot of the Cotswold hills, about eleven miles from the city of Gloucester, eight from the town of Berkeley, and five from the river Severn. Its general aspect is towards the north, having Frocester hill, part of the Cotswold range, on the south of it, from the edge of which it reaches about two miles from the river below. It is all inclosed with hedges and ditches. The hedges are for the most part broad, and composed of black and white thorn, hazel, &c. These hedges are very old, and probably have been formed by being left, when the ground was first cleared from its natural wood, with which the whole of this vale seems once to have been covered.

The soil is of two kinds. The one of these, on the sand formation, which lies above the blue lias clay, is of a light sandy nature, of a brownish colour, containing a considerable portion of vegetable matter, and naturally producing ferns, and good, sweet herbage. Its distance from the farm buildings, and its elevation being upwards of three hundred feet above them induce the farmer to keep it in constant pasture for sheep and young beasts.

The second kind of soil, which is upon the blue lias clay, is of various depths, and contains an admixture of vegetable mould and clay, thickly interwoven with fibre in a decaying state, decreasing in quantity as the depth of the soil decreases. The whole of this soil, where it is deep, appears to be full of vegetable matter, and where it is dry, or on a bed of calcareous gravel, it produces a most abundant herbage of the richest quality, which varies in its nature and richness with the nature and depth of the soil. A great portion of decaying vegetable matter in the soil would therefore seem essential to the production of rich pasture. The fields, which are nearest to the homestead, have been pastured from time immemorial. Some of

these, having a subsoil of calcareous gravel, and being naturally dry, their herbage is of a quality superior to that of the rest of the farm, and they are thickly covered with the finest and most nutritive grasses.

The farm buildings are situated at the north-west side of the farm. These are a good dwelling-house, a dairy-house, feeding stalls for twenty-five beasts, two shades, several courts, stables, and a barn two hundred feet long and thirty wide, built about 600 years ago, and now used as a store for the best hay.

Management of fields.

The principal object of the dairy-farmer in the management of his fields, is the production of good pasture and hay for dairy-cows, and for raising as many young cows as will be required to fill up the place of those, which either from age or casualties fail in being productive milkers.

It is generally thought that grass-land should be pastured and mown alternately; and when the ground is never manured, this would seem to be the best way of managing it, unless, as is the case in most farms, there are certain grounds, which, when pastured by cows, produce not only much the greatest quantity of milk per cow, but also much the greatest quantity of cheese per gallon: these grounds the intelligent farmer will select for pasture to his cows in preference to all the others. Hence, on most dairy-farms, there are grounds that are always pastured, being those that are most productive of cheese, and, for the most part, nearest to the homestead. Of course there are, on such farms, other grounds, which are mown every year. With respect to these we would remark, that as, though frequently manured, they are sometimes apt to be overrun with yellow-rattle, a biennial weed, they should be pastured for at least two years in succession, and the ground should be skimmed over with the scythe, when the weed is coming into flower. This would completely extirpate it.

The poorest fields of this farm are seldom or never allowed to be pastured in the spring, as it throws them far back at harvest-time. Some of the fields that are manured, are generally kept for pasture for the sheep in the spring, upon which they are folded, and get a fresh portion of the field every day, by which means the grass is eaten up clean. When there is a scarcity of keep, this is sometimes continued till the middle of April or beginning of May, when the ground is cleaned, and shut up for hay.

Draining.—The whole of this farm has been drained. The draining plough has been resorted to, where the sub-soil of clay is near the surface; and, in pasture land, where the plough reaches the clay, this mode is both the cheapest and the most effectual. Turf-draining answers well, where the turf is strong enough to bear ramming; and where it is not, stone or draining tiles answer the best, but they are both more expensive than turf-draining.

Manure.—From the small quantity of arable land on this farm, there is very little straw raised and none of it can be spared for litter to the cows, when foddered in the several courts. The dung, therefore, that is collected in the court-yards is of the richest description, the whole of it having pas-

ed through the stomachs of the animals. It is frequently mixed with earth and the scourings of ditches, and is always carried to the mowing ground in the beginning of winter—in the time of a frost, if possible, that the turf may not be injured by the hauling of it over the ground.

The land which is pastured by cows is never manured, manure imparting a rankness to the grass, which not only gives a rank flavor to the cheese, but also makes it 'heave' or ferment, which is injurious to its quality.

There being a great deal of dung collected on this farm, the mowing ground is generally manured once in two years. The dung being spread over the ground with hay forks, is brushed into the ground, the first fine weather in February or March, with a brush-harrow, made of a heavy gate, between the rails of which thorns are fixed, and which is generally loaded with a log of wood. This brush-harrow is drawn over the ground by a horse, going at a very quick rate; and after it has done its work, all the stones and stricks are picked off the ground, which is then rolled and harrowed up for mowing.

Dressing or cleaning up the ground.—About the first of March, or earlier, if the weather is dry, they begin on this farm to clean up the pasture as well as the mowing grounds, and to 'hain' or shut them up, either for mowing or for the dairy-cows to be turned into in the end of April or first week in May. This operation is performed by men, women, or boys, with the common hay-fork, which with the back downwards, is swung right and left upon the dung, which the beasts have dropped during the time they were foddered in the field, and also upon the molehills, which by this operation are beat into small pieces, and at the same time, scattered over the ground, or rather rubbed into it. The waste hay, all straw, stones, sticks, &c., are picked up and carried off the ground, before it is rolled, in the end of March or beginning of April. The fields, when thus cleaned, are shut up, whether they are for mowing or pasture; and those grounds that are to be the latest mown are the last that are cleaned and shut up.

All the rough grass, which, the cows do not eat, is mown off, and the weeds cut up once or twice a year. The rank grass produced on those spots on which dung has been dropped in the spring the cows do not eat, and it is 'skimmed over' or mown, and made into hay for young stock in the winter. From these spots, after being mown, there springs a new crop in autumn. If they were not mown, the long grass would decay and get rotten at the bottom. These tufts of rank grass are, however, sometimes left, and eaten up by store stock in winter.

Hay.—The age or state of ripeness, at which a crop of grass is cut for hay, is of great importance, for on it depends the quality of the hay. The earlier it is cut, the better will be the quality of the hay, and the greater will be the quantity of the after-grass; and the longer it stands before it is cut, the greater will be the quantity of the hay, but it will be of an inferior quality, and the after-grass will be diminished in a much greater proportion than that in which the hay is increased. Early mowing, therefore, is always practised on this farm. The mowing begins the last week of May or the first week of June, when the grasses are in blossom, and when they are seldom more than six weeks old.

The mowing should be so performed, that neither the strokes of the scythe nor the junction of the swaths can be discerned. This is easily accomplished by fixing the scythe to the handle, so as to have it level with the ground during the operation of mowing, by not taking on too wide a swath, and by making the scythe come out a little beyond the standing grass every time.

The more expeditiously grass is converted into hay, and the more of the natural juices of the grass the hay retains, the better is its quality. It cannot be too often tedded or shaken abroad, while passing from a state of grass to a state of hay, particularly in the first stages of the process. The hay-machine, therefore, is of great advantage in the work; for besides that a boy and a horse can, with it, do as much work as eight men, it does the work with more expedition and much more perfectly, all the grass being completely separated and spread regularly over the ground to dry; and the hay, in consequence, is at least ten per cent. better in quality than that which is made by the hand.

The hay, in three or four days after mowing, if the weather is favorable, is either put into wind cocks or carried to the rick. The ricks of hay are made in those fields which are dry, and in which it is intended to fodder some of the stock during winter. The best hay is taken to the homestead, and either ricked in the yard or put into the large barn formerly mentioned, in which several hundred tons of hay can be secured.

[Stock.

Mr. Drinkwater S. Hayward has rented this farm for thirty, and his family for many years. He keeps a pack of a hundred cows, composed of the best milkers, or those from whose milk the greatest quantity of cheese is made; and in selecting calves for weaning to keep up his stock, he takes those of the best milkers. His stock is of a mixed breed; and that which he prefers is a cross of the Gloucester and the Alderney with a Durham bull, producing a stock half Durham, one-fourth Gloucester, and one-fourth Alderney. Having had the good fortune to get an excellent milker of the true Hereford breed, a very uncommon thing, he is proceeding in the same way with this cow, crossing first with an Alderney and then with a Durham bull. This stock of course is one-half Durham, one-fourth Alderney, and one-fourth Hereford; he expects it to be of a very superior kind, and not only excellent milkers, but of the finest symmetry and with high feeding properties; and from the present appearance of the stock, there is every reason to think this will be the case.

To keep up his stock of dairy-cows, Mr. Hayward weans thirty heifer-calves every year. Some of those that are weaned before March produce calves when two years and a quarter old, and all the others come in at three years old. Mr. H. has, therefore, a hundred cows, thirty heifer-calves, thirty year-old heifers, thirty two-year-old heifers, and thirty three-year-old heifers; which last take the place of thirty cows that are yearly drawn from the stock, and disposed of. These thirty cows consist of such heifers as have slipped their calves, or have proved "empty" or barren; and of aged cows, which are sold to graziers.

The young cows are disposed of as soon as possible; but the old ones are kept as long in autumn as their milk will pay for their keep.

Management of cows.—The cows are generally turned out to grass in the end of April or beginning of May, upon those grounds which Mr. Hayward has found, from experience, to produce the most and the richest milk. These grounds are nearest to the home-stead, and have always been pastured. The driving of the cows before milking, and the carrying of the milk to any considerable distance, are found to injure the quality of the cheese; and to avoid this consequence, the pasture-grounds should always be, as on this farm, near the homestead.

The cows, on this farm, are divided into three lots, the young and weak ones being in one lot. Each of these three lots has two fields of pasture, and they are generally kept a week at a time in each field; so that they have fresh pasture every week—an advantage much greater than most farmers are aware of. Great care is taken never to overstock the pasture of the cows. They ought, at all times, to have a full bite of close, short, fine grass. Long overgrown grass gives a rank flavor to the cheese, and should always be avoided.

In dry seasons, when the pasture has got too short, some of the fields that were intended for mowing are given up to the cows for pasture. When the hay is all cleared off the mowing grounds, and the after-grass begins to grow (it generally takes several weeks to make much appearance,) the cows are shifted in these grounds. Land which is long pastured by any animal gets foul or unsound for it, and the after-grass always makes the cows spring their milk. They are, therefore, generally moved from the pasture grounds into the after-grass before there is much of it for them.

It is very essential for cows to have a shade and water in every field. The shade of large trees, however, is the only shelter from the sun and the storm, which they have on this farm, and indeed in the whole vale.

Cows should, in winter, be kept as warm and comfortable as possible. Every dairy should be provided with shades and warm courts for the cows; but in the vale there is scarcely an instance of accommodation of this kind for one-fourth of the cows, and there is not more on this farm. Hence most of them are foddered in the driest and warmest grounds; and before calving, they get hay served out to them morning and evening; but after calving, they are fed three or four times a day, and with the best of the hay.

Calves.—The calves are allowed to remain with their mothers for about a week after they are dropped, because the milk, during this time, would not do for making cheese. The best of the heifer-calves are selected for breeding. Such of the remainder as are dropped before March are fattened; those that are dropped after that time are sold young, as, then, veal generally becomes cheap, and milk is of more value for making cheese than for feeding calves.

After the first week, the calves that are to be weaned are parted from their mothers, and put on the calves' stage, a sort of crib erected in the calves' houses, which being raised one foot from the ground, and being open in the bottom, keeps

them dry without the help of litter. Here they are allowed two quarts of sweet milk in the morning, and the same quantity in the evening, for the first six weeks. At the end of this period they begin to eat hay, some of the best of which is given to them; and, instead of milk, they get a mixture of sweet milk and water. They are turned out into some of the earliest and best pastures, as soon as there is any for them.

The whole breeding stock are distributed into lots, according to their ages, and kept apart summer and winter. They are kept either on the upper field of this farm, or taken to another farm on the hills, where they are treated in the same way as the breeding stock are on Beverston farm.

Sheep.—There are upwards of three hundred sheep kept on this farm. They pasture the upper field in summer; and in autumn and winter they eat up the rough grass left by the cows. The management of the sheep is the same as that practiced on Beverston farm, to the account of which we refer the reader.

Pigs.—Upon this and every dairy farm, a number of pigs are necessary to consume the whey—one pig to two cows in summer, but not so many in winter. Their food in summer, is grass, clover, vetches, and whey; in winter, raw potatoes, with tallow, corn, whey, and skimmed milk. When they are being fattened, bean or barley-meal is mixed with boiled or steamed potatoes, in the proportion of a bushel of meal to two cwt. and a half of potatoes. The breed of pigs kept on this farm is the Berkshire, with a small mixture of the Hereford. Some of them are sold in a store state; most of them are fattened. Five or six breeding sows are always kept, which are regularly fattened off, when one year and a half old, and fed to about three cwt.

Management of the dairy.

It is acknowledged by every one, at all acquainted with the subject, that the quality of cheese does not depend upon the superior richness of the soil or the fineness of the herbage; for cheese of the first quality is frequently made from land of an inferior description, and from herbage of a coarse nature. Nor does the quality of the cheese depend on the breed of the cows, for cheese of the best quality is made from the milk of cows of all the different breeds that are to be found in the country: we think it principally depends on the management of the cows as to their food, &c., of the milk in converting it into cheese, and of the cheese, till it is fit for market.

The following circumstances are injurious to the quality of cheese: allowing the cows to get rank or ill-flavored grass or hay, these conveying a bad flavor to the milk and cheese—allowing the cows to run and heat themselves—driving them far to be milked, which makes the milk froth much in milking—carrying the milk from the place of milking to the dairy; and allowing it to remain long after it is milked, before it is set with the rennet.

The greatest dependence is upon the dairy-maid; and the chief art of making cheese of the finest quality lies in her management. The superintendence of the dairy invariably devolves upon the farmer's wife. Mrs. Hayward attends to every minute circumstance in this department, and the

following is a report of the information she has obligingly communicated to us respecting the whole economy of the dairy of this farm.

The management of the dairy should be conducted with the greatest regularity. Every operation should be performed precisely at the proper time. Either hastening or delaying the execution of it will cause cheese of an inferior quality to be made of milk from which the best may be obtained. A dairy-maid is selected for skill, cleanliness, and strict attention to her business. Her work commences at four o'clock in the morning, and continues without intermission till bed-time.

Dairy house.—The dairy-house should be kept at a temperature of between 50° and 60°; and the drier it is kept the better, as both milk and cream retain their sweetness much longer in dry than in damp air. Every time, therefore, the dairy is washed, it is dried as quickly as possible.

Around two sides of the dairy, there are broad shelves, made of elm, for putting the vessels that hold the milk and cream, and the newly made cheese upon. On another side there is a frame with three large stone cheese-presses. In the middle of the north side is the door; and in the corner, on the left, is the stair leading up to the cheese-lofts; and behind the door is a single cheese-press, which is generally used in pressing the cheese at first time, before it is cut down and put through the mill. In the middle of the floor stand three leaden vessels, large enough to hold all the whey of one "meal" or milking; and by the side of these stands the cheese-tub.

Above the dairy there are two cheese-lofts, around the sides of which there are broad shelves for holding cheeses; and in the middle stands a frame for holding two rows of boards, called here "cheese-tack," which being only about eight inches apart, contain a much greater quantity of cheese than could be disposed on the floor. The stair to the cheese-lofts is of oak, and seems to be the pride of the dairy-maid, for it is dry rubbed and polished so smooth, that it is dangerous to walk upon; but this sort of pride is encouraged as evincing an attention to cleanliness.

Along the north side of the dairy there is a shed, which communicates with the dwelling house. In this shed the utensils are kept upon a stand for the purpose, the cream is churned, and other work performed, nothing being done in the dairy, but the making of the cheese and the making up of the butter.

Opposite to the door of the dairy and detached from the shed, is a wash-house with a pump-well, at the door of it. In this wash-house, the water and the milk are heated in boilers for the purpose; and all cleaning work is performed.

Utensils.—The milking-pails are made of maple, on account of the lightness of the wood and its cleanliness of appearance. They hold about six gallons each, and the cheese-tub is of a size large enough to hold the whole of the milk. The ladder, the skimming-dish, and the bowl are of maple. The sieve for straining the milk is about fifteen inches in diameter, and has a hair-cloth bottom.

There are a number of cheese-vats, sufficient to hold all the cheese made in four or five days. They are made of elm, and turned out of the solid. That which gives five cheeses to a cwt., is considered the best size for double Gloucester,

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the inside diameter of which is fifteen inches and a half, and depth, four and a quarter; and that is considered the best for single Gloucester, which gives eight to a cwt., the diameter within, being fifteen inches and a half, and depth, two and a half. Round boards, called "suity boards," made of elm, of the diameter of the cheese-vats, and thicker in the middle than at the edges, are occasionally necessary to place on the cheeses, when in the press, if the vats are not quite full. Without the assistance of these boards, the cheeses will be round in the edges, (a proof of not being well pressed,) and not so handsome.

The cheese-presses are made of stone, as being the cleanest material for the purpose, and of steadiest pressure. They weigh about seven cwt. each; they are raised by a block and tackle; and the whole apparatus is painted white.

From the whey leads, which are oblong and about eight inches deep, there are leaden pipes which convey the whey into an under-ground cistern, near the pigs' houses, where, by means of a pump, it is raised, when wanted, for the pigs. Leaden keep the whey longer sweet than wooden vessels, and are much easier kept clean. This is done by scouring them with ashes of wood, and washing them well every time they are emptied, which is every thirty-six hours.

Tin vessels are used in preference to earthenware for holding the milk that is set for cream, and also for holding the cream. Those used for the cream hold about four gallons each, and are made with a lip for the convenience of shifting the cream from one of these vessels into another. This is done once every day during summer; and there is a wooden elice or knife always kept in the cream vessel, with which the cream is frequently stirred during the day, to prevent a skin from forming on the top of it, which is injurious to the quality of the butter. The skimming dish, used for taking the cream off the milk, differs from that used in cheese-making, being made of tin, with holes in it, to let the milk run out that may be taken up with the cream.

The butter-scales, prints, and butter-boards are of maple. The boards for making up the butter in half-pound rolls are about one foot long and nine inches wide. The barrel-churn is made of the best oak, and great attention is paid to its cleanliness. The butter-milk is never allowed to remain in it; but it is washed, scalded, and put up to dry, as soon as the butter is taken out.

Milking.—This is performed in three separate courts, to which the cows come from their several fields. The milkings should be as near as possible at equal divisions of the day, commencing at about four o'clock in the morning and three in the afternoon. To each milker eight cows are assigned, and one man carries the milk from all the milkers to the dairy. The milking should be finished in an hour. The dairy-maid sees that the milkers do their duty, and that all the cows are milked clean; for the milk that comes last is the richest; and, besides, if the cows are not clean milked, there will be a gradual diminution of the milk, perceptible daily: for these reasons the greatest care is taken that the cows are clean milked.

Cheese making.—The cheese-tub being put in its place in the dairy, the ladder is put across it, and a large thin canvass cloth covers the whole tub and ladder to catch any of the milk that may

drop from the pail, and to prevent dirt from falling into the tub. Above this and upon the ladder is placed the sieve, through which the milk is strained. If the milk should not be of the temperature of 85°, a portion of it is put into a deep tin, kept for the purpose, and placed in a furnace of hot water in the wash-house, by which the whole is warmed to a proper degree. It is of the utmost moment to attend to this; for if the milk is not warm enough when the rennet is put into it, the cheese will be "tender," and will bulge out in the edge, which spoils its appearance, and a great quantity of sediment of small curd will be found in the whey leads, which is so much curd lost. If, on the other hand, the milk is too warm, it will cause the cheese to "heave" or ferment, which injures both its appearance and quality.

When the milk is sufficiently warm, the coloring and the rennet are put into it. The coloring or anatto is put in by rubbing a cake of it on a plate amongst the milk until, from its appearance, it seems colored enough. One pound of anatto, at five shillings, is sufficient for half a ton of cheese.

The rennet being added immediately after the anatto is put in, the tub is covered with a woollen cloth for, at least, an hour. Rennet or runnet is made from the stomachs of calves, called here "vells." Irish vells are the best: they are cured, and sent to England, and sold by the grocers to the dairy-farmers. Mrs. Hayward never uses them till they are twelve months old, for, if they are not old, the rennet made from them causes the cheese to "heave," and to become full of "eyes" or holes. She prepares the rennet from them by adding to every six vells two gallons of brine and two lemons. The lemons do away with any disagreeable smell, and give the rennet sweetness and agreeable flavor. Twenty or thirty gallons of it are made at a time, as it is found to be much better, when made in large quantities. It should never be used, till it has stood for, at least, two months.

When the curd is sufficiently firm for breaking, it is gently and slowly cut with a three-bladed knife, down to the bottom of the tub, (the knife being about fourteen inches long,) both ways or at right angles, and around the sides of the tub. The cuts should be about an inch apart. When it has stood five or ten minutes to allow it to sink a little, and the whey to come out as clear as possible, some of the whey is dipped out of it with the bowl, and the curd is cut a second time with the three-bladed knife—very slowly to begin with; for, if the cutting is done hurriedly, a great sediment of very small curd will pass through the sieve and be found in the whey leads, and there will also be an increase of the quantity of whey butter which should have been in the cheese, and the value of the butter, thus obtained, will not compensate for the waste of curd, and for the loss of credit which the cheese will sustain from the abstraction of butter from it. The cutting being, therefore, performed very slowly at first, and with the strokes of the knife at a considerable distance from each other, is gradually quickened, and the strokes are taken nearer and nearer every time. At last, one hand, with the skimming dish, keeps the whole in motion, turning up the lumps suspended in the whey, while the other, with the knife, is in constant motion, cutting them as small as possible—and this operation is continued till no

more lumps are brought to the surface, and the whole mass is reduced to one degree of fineness. This process may occupy a quarter of an hour.

The curd is now allowed to stand a quarter of an hour, and being, thus, sufficiently settled, the whey is taken from it with the bowl, and poured through a very fine hair sieve, placed over the whey leads. When the greatest part of the whey has been separated from it, the dairy-maid, folding over a portion of it, and beginning at one corner, goes around the tub, cutting the curd into lumps, and laying them on the principal mass, by which operation the mass is carried all around the tub, and most of the remaining whey escapes between the cut fragments, as they lie and press upon each other. From time to time the whey is taken from the tub, and put through the sieve into the whey leads.

The curd is then put into vats, and pressed down with the hand. The vats, being covered with cheese-cloths, about one yard and a quarter long, of fine canvass, are placed in the press for half an hour, when they are taken out and the curd cut into slices, and put into a mill fixed on the top of the tub, which tears it into very small crumbs, as small as vetches. This mill, which is of Mr. Hayward's construction, is a great improvement in the making of cheese, not only as it saves the dairy-maid the most laborious part of the process, that of squeezing and rubbing the curd into small crumbs with her hands, but as it allows the fat to remain in the cheese, which the hands squeeze out.

In its pulverized state, it is customary with most dairy-maids to scald the curd with hot whey; but Mrs. Hayward considers cheese richer, when made without scalding the broken curd, this washing the fat out of it. She, therefore, without scalding it puts it into the vats, and presses it closely together with the hand, in filling them. In making double Gloucester cheeses, particular care is taken to press any remaining whey from the curd as the vats are being filled, and they are filled as compactly as can be done with the hand, being rounded up in the middle, but just so much so, as that the whole can be pressed into the vat. Cheese-cloths are then spread over the vats, and a little hot water is thrown over the cheese-cloths, which tends to harden the outside of the cheese and prevent it from cracking. The curd is now turned out of the vats into the cloths, and the vats being dipped into the whey to wash away any crumbs of curd that may cling to them, the curd, inverted and with the cloth around it, is again put into them. The cloths are then folded over and tucked in, and the vats, as they are filled, are put into the press one upon another. The bottoms of the vats are smooth and a little rounded, so as to answer the purpose of cheese-boards, which, therefore, are only wanted for the uppermost vat, or when the other vats are not quite full. The vats are allowed to remain under the press about two hours, when they are taken out and dry cloths are applied, which with double Gloucester cheese should be repeated some time in the day.

Salting and salting-presses.—The vats, when the clean cloths are given, as just mentioned, are changed from the single press to the one next to it, and placed in it, one upon another, as before. They remain in this press till the cheeses are salted, when those made in the evening take the

place, in the press, of those made in the morning, and those made in the evening are, in their turn, displaced by those made the following morning, the cheeses of the last making being always placed lowest in the press, and those of the other makings rising in it according to the priority of making. The same order is observed in the other two presses, the last or newest making in each being lowest, and each making having next above it that which was made last before it. The cheeses pass through the three presses in this order, advancing a step in their progress at each 'meal' or making, till, at last, in four or five days, they come out of the presses and are put upon the shelves. They are generally salted at the end of twenty-four hours after they are made, though this is done by some at the end of twelve hours. The salting should never be begun till the skin is all closed, for if there be any crack in the skin of the cheese at the time of salting, it will never close afterwards. The salting is performed by rubbing with the hand both the sides and the edge of the cheese with finely powdered salt. The cheese, after this, is returned to the vats, and put under the press, care being always taken, according to what has been said, to put the newest cheese lowest in the press, and the oldest uppermost. The salting is repeated three times with the single, and four times with the double Gloucester, twenty-four hours being allowed to intervene between each salting. After the second salting, the cheeses are returned to the vats without the cloths, that the marks of the cloth may be effaced, and the cheese may get a smoothness of surface and 'keenness of edge, which is a peculiarity of Gloucestershire cheese. The double Gloucester remain in the presses five days, and the single, four; but in damp weather they should remain longer. The quantity of salt generally used is about three pounds and a half to a cwt. of cheese.

The cheese room.—When the cheeses are taken from the salting presses, they are put on the shelf in the dairy for a day or two, where they are turned once in twelve hours. They are then taken to the cheese-loft to make way for the new ones. In the cheese-room, either on the floor or on the 'cheese-rack,' they are turned once every day; and, in general, in a month from the time they were taken out of the vat, they are ready for cleaning, which is done by scraping them with a common knife. The dairy-maid, in doing this, sits down on the floor, takes a cheese in her lap, and with the knife scrapes both sides and edge clean, taking off all scurf they may have contracted. The cheese, if intended for the London market, as is generally the case, when it has been thus cleaned, is rubbed all over with a paint made of Indian red, or of Spanish brown, or of a mixture of both, and small beer. It is rubbed on with a woollen cloth. After being painted, it is turned over twice a week, and oftener in damp weather; and, as soon as the state of the paint will permit, the edges of the cheese and about an inch of each side is rubbed hard with a cloth, at least once a week.

Characteristics of true Gloucester.—The marks of true Gloucester cheeses are,—'the blue coat,' which arises, through the paint on their sides, and which is a sure sign of their richness and sweetness,—the yellow, golden hue of their edges,—a smooth, close, and wax like texture,—a very mild and rich flavor,—not crumbling when cut into thin slices, nor parting, when toasted, with the oily

matter they contain, but softening, without burning. If cheese has been soured in the making, either from being too long in hand, or from want of attention in scalding the utensils, nothing will cause it to assume the blue coat. If the curd is salted, when ground down before being put into the vats, the salt has the effect of giving a skin to each of the particles of the curd it comes in contact with, which prevents them from intimately uniting; and, although the curd may be pressed together and becomes good cheese, yet it never becomes a smooth, close, solid mass, like that with is salted after it is made, but is of a loose texture, and crumbles when cut; and although it may be equally fat, yet in toasting the fat melts out of it, and the cheesy part burns. The skin of the cheese, too, is not tough and solid, but hard and brittle, and when examined seems to be formed of many irregular portions, something like mosaic work.

Making of the butter.—The milk as it comes from the cows, is strained through a hair-sieve into the tin vessels, which are about four inches deep. It is allowed to stand only twelve hours, when the cream is taken off with the skimming-dish and put into the cream vessels, and the milk is warmed and carried to the cheese tub. The cream is shifted into fresh cream vessels once a day, and is also stirred frequently during the day with the wooden knife, that is always kept in each of the cream vessels. This continued shifting and stirring of the cream prevent a skin from forming on the top of it, which is injurious to the butter.

In summer or in hot weather, several gallons of cold water should be put into the churn, and allowed to remain an hour in it to cool the churn, before the cream is put into it. The cream is strained through a coarse canvass cloth kept exclusively for this purpose, and then put into the churn. The operation of churning should, in summer or in hot weather, be very slow, otherwise the butter will be very soft when taken out: but in winter or in cold weather, and particularly in frosty weather, the churn should be prepared for receiving the cream by putting hot water into it, and allowing it to remain for half an hour to heat the churn; and, then, the operation of churning should be performed quickly, and now and then the air, that escapes from the cream in churning, should be let out of the churn, or it will make the cream froth, and lengthen the process of churning very much.

When the butter is taken out of the churn, it is customary with most people to wash it with cold water before salting it. This is never done here, Mrs. Hayward having found from long experience, that butter retains its sweetness much longer when no water is used in making it up. When it is taken out of the churn, it is well worked with the hand, which presses out most of the milk; it is then beaten with a cloth, or rather, a cloth is repeatedly pressed down upon it, which absorbs all the remaining milk. When this is properly performed, and no trace of butter-milk remains, it is salted to the taste with finely powdered salt, which is well mixed with it by working it in with the hands. It is then weighed into half-pounds, and made up in rolls, about nine inches long. The process of making butter from the cream of whey is the same as that just described. Butter is made twice a week during summer.

The quantity of milk butter made on this farm,

is about 16 lbs. per cow, and that of whey butter about 25 lbs. per cow per annum. About 2½ lbs. of salt are used to a cwt. of butter.

Comparative estimate of the several applications of milk, viz., to the feeding of veal, and to the making of cheese and butter.

In feeding calves for the butcher, it generally takes seven weeks to feed them to about a cwt. each; and they consume the following quantity of milk in the seven weeks: About 10 gallons the first week; 16, the second; 20, the third; 24, the fourth; 27, the fifth; 30, the sixth; and 32, the seventh; so that, it takes 159, or say 160 gallons of milk to produce 112 lbs. of veal. The average money value of the above modes of converting milk into a marketable commodity will stand thus:—

100 gallons of milk produce	
112 lbs. of cheese of the best	
quality, which at 6d. per lb.	
is - - - - -	£2 16 0
And 5 lbs. of whey butter, which	
at 8d. per lb. is - - - - -	0 3 4
Value of 100 gallons of milk,	
when converted into cheese - - - - -	£2 19 4
100 gallons produce of milk	
butter 34 lbs. which at 10d.	
per lb. is - - - - -	£1 8 4
And of cheese of the worst qua-	
lity 74 lbs., which at 3d. per	
lb., is - - - - -	0 18 6
Value of 100 gallons, when	
made into butter - - - - -	£2 6 10
160 gallons produce 112 lbs. of	
veal, which at 7½d. per lb., is	£3 10 0
But calves, when dropped, ge-	
nerally sell at 10s. each,	
which being deducted - - - - -	0 10 0
Leaves, as the value of 160	
gallons, and therefore the va-	
lue of 100 gallons in feeding	
veal - - - - -	£3 0 0 1 17 6

Thus, making cheese of the first quality is more profitable than either making milk-butter or feeding veal; yet many farmers continue to feed calves during the early part of the spring—a practice not justified by an examination of results, but persevered in from habit, as many practices are, where active pursuits are not conjoined with a spirit of inquiry and comparison.

From the Farmers' Cabinet.

ANTI-LIME.

Mr. Editor—Being informed by a neighbor, that you offer to publish experiments made in agriculture, for the information of your readers, I take the liberty to send you an account of the following, which I made last summer, to test the relative value of the several different manures in raising corn. I selected five acres of worn out land, in one piece, and of a quality as much alike as possible, and ploughed it flat, some time in April. On one of these I spread one hundred and fifty bushels of marl, procured from Woodstown,

in this county; on another, one hundred bushels of drawn ashes; on the third fifty bushels of fresh slacked lime; and on the fourth, forty bushels of bone dust, so called—that is, bones ground, say three parts into small fragments, and one part into a coarse dust or powder—which I procured at a button factory in the neighborhood of Bridgeton. The fifth acre I left without manure of any kind, in order to test the actual value of the different manures used on the other four acres. Cost of the manures was as follows: the marl, which I hauled about ten miles, I put down at ten cents per bushel, including the carting, that is, fifteen dollars for the first acre; ashes, ten cents per bushel, or ten dollars for the manure of the second acre; lime, sixteen cents per bushel, including the cost of hauling, will make eight dollars for the third acre; and bone dust, for which I paid forty cents per bushel, to which add four cents per bushel for hauling, makes seventeen dollars sixty cents for manure used on the fourth acre. The cultivation of the whole five acres was the same; and the result of the crop taken and measured, from each acre, was as follows:

Bone dust produced twenty-six bushels; ashes, twenty-four bushels; marl twenty-two bushels; lime only six bushels; and the unmanured acre six bushels also.

Much has been written in favor of lime. As far as my experience goes, and I have tried it on several occasions, I have never found any, or but very little benefit from it the first season: but in two or three years, it will generally produce a very sensible increase on some of the crops following, especially on oats and on clover. I do not therefore consider lime as the poor man's friend; though in those parts of the country where ashes, marl, or bone dust, are not to be readily procured, I should recommend its use.

ABBOTT ATKINSON.

Pittsgrove, Salem county, N. J.

Feb. 10, 1840.

From the Providence Courier.

A FARMER'S LIFE AND DUTIES.

If we were ever envious, it was of the farmer—the intelligent, independent farmer, who owned his land, his house and barns; who was free from debt, whose family were growing up prosperously around him, upon whom God smiled and blessed. We have seen such a farmer; and in truth, we know of no man so happy, and no business so permanently profitable—none that makes the owner so independent. An independent farmer has his house to live in—it is his own—he has earned it by the labor of his hands. He has his granaries filled with the production of his farm, his barns with the stock reared, and the hay raised upon his farm. His cellars are filled with the necessities and comforts of life. Almost every thing necessary to feed him and his family, grows around him. He may raise his own pork, fatten and kill his own sheep, eat his own poultry and his own eggs—live upon his own home-made bread—weave his own cloth—raise his own wool—knit his own stockings, through the agency of his wife and daughters—make his own butter and cheese; in short, live and dress comfortably, with:

out going off his own homestead. This is no fiction; and it is a fact, that the farmer is the most independent man in the community.

But in order to be happy, and make his life useful as it ought to be, he must be intelligent—in possession of the means of knowledge—especially that kind of knowledge which relates to his own profession. He must use the means which God has given him, to be happy himself, and to contribute to the happiness and comfort of those around him. In justice to himself he will employ his evenings in the acquisition of knowledge. He will be a reader of useful books, and a supporter of the public press, which brings to his door the newspaper which gives him the history of the world. Such a farmer as this will fulfil his duties to his God, and his fellow-man, and is the happiest and most independent among the best of men.

MR. JACOB SHEIMER'S SYSTEM OF FARMING.

From the Genesee Farmer.

Notes of a conversation had with Jacob Sheimer, Esq., a German farmer, of great skill, who resides in Saucon township, Northampton county, Pa. He ranks high as a practical farmer in a place which has been long celebrated for its fine farms, and good farmers. He says that his farm contains just one hundred acres of farm land, which is divided into eight equal fields, excepting four acres which is allowed for house, barns, garden, &c. One field is in with corn, three with wheat, and one with rye, and three for mowing, pasture, &c.

He breaks up his corn stalk ground for wheat the last of May, and immediately harrows it well, and then furrows it out into eight pace lands for lime, a half bushel at each corner, when the stable manure is put on. It is ploughed a second time before harvest; immediately after harvest cross and harrow well, and then sow about the 28th of September with one bushel and a half of clean wheat per acre, to be ploughed in with a one horse plough very shallow, and then harrowed.

The next spring sow with clover seed at the rate of one bushel to eight acres. The following year to be mowed, and immediately after mowing, strike one furrow across the field and back again every forty-five feet; turn no cattle in, but when the second crop is large enough, plough it nearly down. If necessary run a harrow over before ploughing; two weeks after let it be well harrowed, and about the 28th of September sow with wheat as before.

Next spring sow with clover seed for pasture until after harvest the following year; then turn it carefully down, harrow it well, and sow as before.

The following year sow no clover seed, but plough the stubble down immediately after harvest, harrow it well, and sow one bushel of clean rye per acre, and plough in.

After the rye is cut off, leave it until the following year when it is to be planted with Indian corn, three and a half feet apart and four grains in a hill, to be plastered in the usual way, and plough well three times.

Mr. Sheimer says that his three crops of wheat are always the best, and he also says he has not missed a crop in thirty years, and that he raises

from ten to twelve hundred bushels of wheat every year.

The thrashing must be finished by the first of March, and the stable dung must be spread over the yard at least once a week; this is all he does to prepare it for hauling out the latter part of June.

You will perceive that his is an eight year course, and that he has one year summer fallow. A practice now prevails in that section, of sowing clover seed among the corn after the last ploughing, and some skillful farmers say they have had good success with it.

No. 1.	No. 2.	No. 3.	No. 4.
Corn,	Fallow,	Wheat,	Clover,
Fallow,	Wheat,	Clover,	Wheat,
Wheat,	Clover,	Wheat,	Clover,
Clover,	Wheat,	Clover,	Wheat,
Wheat,	Clover,	Wheat,	Rye,
Clover,	Wheat,	Rye,	Corn,
Wheat,	Rye,	Corn,	Fallow,
Rye,	Corn,	Fallow,	Wheat,

No. 5.	No. 6.	No. 7.	No. 8.
Wheat,	Clover,	Wheat,	Rye,
Clover,	Wheat,	Rye,	Corn,
Wheat,	Rye,	Corn,	Fallow,
Rye,	Corn,	Fallow,	Wheat,
Corn,	Fallow,	Wheat,	Clover,
Fallow,	Wheat,	Clover,	Wheat,
Wheat,	Clover,	Wheat,	Clover,
Clover,	Wheat,	Clover,	Wheat.

OLD NORTHAMPTON.

SWAMP MUD FOR MANURE.

From the New England Farmer.

Mr. Fessenden—In my last note to you I promised to give some further account respecting the decayed vegetable matter, generally called swamp muck, which many sections of our country abound with. The use of which, applied on an upland loam, gravel, or sandy soil will pay the expense of labor in removing it, two for one the first year, as the statement of facts hereafter annexed, fully proves.

The last fall I carted several loads of muck on to a knoll of loam, and put it in one heap, though I think it would have been better to have dropped one load only in a place. In the spring, prior to planting corn, the muck was spread and ploughed under. The crop of corn where the muck was spread, was large. I thought larger than where barn yard manure was put. A neighboring farmer has made use of muck for several years. The first year he thought it equal to barn yard manure, and its effects were perceivable a much longer time. The soil on which the muck was put, was a warm gravelly loam. The muck was used by another neighboring farmer, for manuring corn in the hill, which was used in the following manner: A row of each alternately, one of barn yard manure, and one of log manure. He assured me the corn was much the best manured with the muck. The soil a sandy loam.

Mr. Daniel Bloomer when residing in North Salem, West Chester county, in the year 1796 had four acres of gravelly loam of equal quality which he planted with corn. Prior to planting the corn, he applied fifty loads of muck per acre, on

two acres; these two acres produced him one hundred and twenty bushels; the other two acres yielded only sixty bushels. The next spring these four acres were sowed with oats and grass seed. The oats was more than twice as large on the two acres dressed with muck as they were on the other two. The grass for the four succeeding years produced in much the same ratio. I might relate other improvements of a similar kind. It is presumed that every intelligent, industrious farmer will be satisfied of the utility of muck as manure. Those farms which are interspersed with swamps of muck and uplands either of loam, sand, or gravel, may be made, at an expense of five to ten dollars per acre, capable of paying an interest annually of one hundred dollars. Ten dollars expended with economy will, in most circumstances, be sufficient to cart and spread one hundred loads of swamp manure on an acre.

Those who are owning farms, situated as just stated, now valued at twenty-five dollars per acre, have only to say the word, and go forward, for one or two years, to convince themselves and their neighbors they have farms intrinsically worth one hundred dollars per acre. Why so? it may be asked. Because they will pay a net profit over and above all expense, amounting to the interest of one hundred dollars. Look for a moment at the statement of Mr. Bloomer. He tells you he applied fifty loads of muck in the spring, (though the fall is a better time, and the muck is better to be laid on lands in the fall,) per acre, which cost him five dollars. On this acre he had an excess of corn of thirty bushels, at fifty cents per bushel, which would leave ten dollars, nearly, to pay the interest of one hundred and fifty dollars at 7 per cent., and this only for the first year. It is worthy to consider, by taking the muck from the low lands, that ditches may be made or improved, so that the low lands may produce bountiful crops of timothy and red top, &c. &c. It is desirable that farmers in different parts of the country would try the utility of the muck on the different summer crops, and inform the public of the results of their labor through your useful New England Farmer, all of which are highly beneficial to us farmers.

HUSSEY'S REAPING MACHINE.

From the Baltimore Patriot.

Mr. Charles Carroll, of Doughoregan Manor, having fully tested the advantages of this reaping machine, during the late harvest, speaks in very decided terms as to its merits. Mr. Carroll has had upwards of one hundred acres of grain cut with this machine, "on all kinds of ground, not too stony, and in light and heavy wheat;" and in a communication to the Chronicle, he gives it as his opinion that it is impossible for cradles to cut grain as clean or as evenly, for it takes every head and leaves the stubble accurately level. In very heavy grain, however, the machine is represented as showing to most advantage—performing in such grace, the work of four cradles, and furnishing employment for eight good active binders. The machine is drawn by two horses, which in constant or heavy work should be changed twice a day. This machine is evidently a valuable invention, or improvement in the matter of harvest-

ing; and Mr. Carroll observes that it may be applied to cutting of clover seed; and with some alterations to the cutting of meadows and all kinds of grass. As to its allotted use as a "reaper," he thinks it will soon be seen upon all farms where it is found necessary to have a thrashing machine.

USEFULNESS OF BIRDS AND TOADS.

From the Boston Courier.

Mr. Editor—I see it stated in your paper of Friday, that the probable reason why the canker-worm commits small ravages in 'Flob,' is found in the care with which the birds are protected. I was reminded of a remark in Peabody's Life of Wilson. "He enters into a deliberate calculation of the value of the services of the red-winged blackbird, which certainly bears no good reputation on the farm; showing that, allowing a single bird fifty insects in a day, which would be short allowance, a single pair would consume 12,000 in four months: and if there are a million of pairs of these birds in the United States, the amount of insects is less by twelve thousand millions, than if the red-wing were exterminated." Let any one, during the brooding season of robins or other birds, rise by break of day and count the number of times old ones return in one hour with worms and insects, or, if he can, let him count through the day, and the number will be found almost incredible.

The practice of killing birds for mere amusement, is not merely indicative of cruelty and want of feeling, but is exceedingly detrimental to the interests of the community. If the farmers reflected and made calculations upon the subject, they would discourage and oppose it as one of the greatest scourges, and would pay a premium to their boys to let the birds alone, rather than furnish them with powder and shot to kill them.

And, now that I am upon the subject of insects and worms, let me add, that there is a very unreasonable prejudice against toads. They are exceedingly valuable in gardens, and other places, in consequence of the exterminating warfare they are continually waging against the bugs and worms. Any person who has them in his garden has a treasure there; and if he will watch them closely, he will find them accomplishing more in the way of preserving his squash and cucumber vines, and other vegetables, than he can do with all his troughs of liquid. I think these subjects will be brought more fully into notice by the gentlemen commissioned by the state to examine into its natural history; indeed I know that one of them, at least, has been at great pains for two years, to collect from all parts of the country what information he could upon the subject, which would be likely to secure the farmer from the ravages which his trees, his grain crops, and all the products of his farm suffer from insects and other causes. I would suggest that this subject be brought up at the weekly agricultural meetings, and that persons acquainted with these matters be invited to communicate their information upon them. For, notwithstanding all the outcry about retrenchment, and useless offices, it seems to me that no offices in the end are likely to be more valuable to us, than those which will bring to light the hidden resources of this state, and collect all

the information, both scientific and practical, which will secure to the agricultural population relief from every thing which blights and diminishes their crops.

S. Y.

GRAPE CULTURE.

From the Franklin Farmer.

Every bunch of grapes, according to Knight, in the Hort. Trans., commences its formation as a tendril, and it is always in the power of the cultivator, to cause it to remain a tendril. The blossoms are all additions, the formation of which is all dependent upon agents, viz., upon the leaves, which are required to elaborate the food, and upon a good exposure to light and heat. Hence the importance of pruning in autumn or spring, to thin and shorten the wood; and in summer, to increase the exposure of the fruit to atmospheric influence. This practice is too much neglected, or too sparingly performed, by novices in the grape culture. It is essential to native as well as to foreign varieties. It is too common a practice to train the Isabella and other native kinds on arbors, and to let the wood accumulate as it will without using the knife, or using it sparingly. The consequence is, that the fruit is lessened, from want of exposure, its time of ripening retarded, and its quality sensibly impaired. One of the most extensive cultivators of the native grape, Mr. E. H. Bonsall, of Germantown, Pa., says, that it is his practice, even after the vines have attained a full capacity for production—say five years from the cutting, to cut them in low—his object is to prepare them for bearing an average of fifty clusters to each, leaving several shoots, from three to five joints to a vine for this purpose; and that when fresh pruned, they will not be more than four feet high at the greatest age. We saw Mr. Bonsall's vineyard, consisting of some acres, in the summer of 1833, and it had a remarkably fine appearance.

In the summer pruning of the grape, let these rules be observed: 1. Suffer only one shoot, and let that be the strongest, to grow from each joint; and if these are very near each other pinch off every other one. 2. When the fruit has set, which will always be upon the new growth of wood, and generally on lateral branches, shorten the fruit-bearing laterals to three or four eyes above the fruit, and the laterals not bearing fruit to one eye from the main vine. The object of the first is to throw the sap into the fruit, instead of permitting it to become exhausted in the formation of new wood; of the second, to preserve the bud at the base of the lateral, which is the fruit bud of the following year; and both to prevent the too great accumulation of wood and foliage. The main vines may soon after be shortened. The extreme buds on the main vines, and generally on the laterals, will generally burst, and throw out a new growth. These may also be occasionally shortened, without injury to the vine or fruit. When the fruit has obtained its growth the process of ripening may be facilitated by thinning the foliage about the fruit, so as to give it a better exposure to the sun and air.

In winter pruning, the laterals may be cut in the main vines, taking care not to injure the buds at their base, and the main vines may be shortened to the required length of two to six feet.

Mr. Bonsall's mode of training his vines deserves notice as well for its cheapness as for its utility—of this we speak from experience. He sets chestnut posts, at the distance of ten feet, firmly in the ground, on the line of his rows. He drives into the face of these at regular intervals, three (we prefer four) stout nails, nearly up to the head. He then stretches wire, of the size denominated No. 11, along the whole line, making it fast at the end, and giving it a turn round the nail in every post. The posts stand five feet above the ground; the first wire is two and a half feet from the ground, the second intermediate between that and the top of the post, and the third at the top. To these wires the tendrils readily clasp, and much labor is saved in tying, while the wires do not intercept the sun from the fruit and foliage. Tinned wire, though it cost more, is preferable to the common sort, as it is far less liable to corrode. Mr. Bonsall plants his rows seven feet apart, and at the distance of four feet in rows. It should be borne in mind, that the richest grounds do not suit the grape so well as those of moderate fertility—as the former produce a superabundance of wood, and fruit of inferior quality.

MANURES.

From the Genesee Farmer.

Almost every distinguished farmer has had some hobby, some favorite method of cultivation, some panacea for all the evils of poor soils and worse cultivation, to the adoption of which all other things are made subservient. Thus, Tull thought of pulverization alone; Cooke's system is drilling and weeding; Lord Dundonald's is draining; Bakewell, in improving cattle and sheep had reference only to size and propensity to fatten; he used to say, he did not care whether there was any wool on his sheep or not; Frederick, Elector of Saxony, went for the wool alone, and the flocks he produced are without a rival. With us, the hobby of some lies in the rotation of crops; some have unlimited faith in renovating soils, by alternating wheat and clover; while others place their dependence on roots. But it may be remarked, that while all other hobbies may occasionally be ridden too hard, the man who directs a considerable part of his time, and his spare capital, to the preparation and use of manures, will have no occasion to regret the expenditure; for it may be put down as a truth in agriculture, that the character of a farm, and the farmer, may be pretty accurately known, by the quantity of manure prepared and used upon the premises.

There are few things in which American agriculturists exhibit a greater want of forethought and good husbandry, than in the general neglect of the means they possess for retaining or increasing the fertility of their soils. Animal manure is, in all cultivated countries, the great agent for promoting fertility, and for replacing those ingredients in the soil essential to vegetation, but which are gradually exhausted by cropping. Whatever opinion we may form of the philosophical theories of the present day, on the subject of nutrition in plants, the fact that animal manure increases fertility is doubted by none, and it is the practice and not the theory with which the farmer should

be most interested. Now, as ever, the stable and the barn yard are the places to which the farmer looks for his supply of manure; and it is to these points that his attention should be directed, when wishing to increase the quantity and the value of this essential article.

One of the greatest losses the farmer sustains, is by allowing the urine of his stables, and the wash of yards to run to waste. Urine, as is now well known, is one of the most active fertilizing agents, and the leachings in the yard contains a very large proportion of the salts that accumulate in such a depository. How often do we see the drainings of the yard and stables, black with decomposed matter, and rich with the most fertilizing of salts, pass off into the highway, or some streams, as though the owner considered them a nuisance of which he was glad to be rid in the best way he could. There are two ways in which this egregious waste may be prevented, and these most essential parts of animal manure saved for the use of the farm. The first and the best way, where the yard will admit of it, is to cover the yard with such a quantity of vegetable earth, turf, swamp muck, wash of the roads, or any light absorbent earth, as to retain the urine and moisture of the manure, and prevent its escape. Where, from the quantity of the manure, or other causes, this drain cannot in this way be prevented, a large vat, or what is still cheaper, a simple excavation may be made in the earth, and the drain conducted into that. If the earth of the pit is too absorbent it may be clayed; but unless it is very porous, it will soon cease to absorb the fluid conducted into it. The reservoir should never be allowed to overflow, but when filled should be taken out, and by means of a cheap apparatus drawn by oxen, distributed over the surface of grass lands, or those intended for crops.

But we hear some one objecting, that all this may be well enough, but it will cost a good deal, and take much hard work to cart this earth to the yards, or distribute the contents of the reservoir. So it will; and what permanent benefit is acquired that does not cost the farmer hard work. The only question is, whether the work is profitably expended; if so, the more work there is done on a farm the better. If a farmer by employing one man for six months of the year, in converting the manure of his yards into compost, by placing in it a few hundred loads of earth, turf, muck, &c. to absorb the moisture of the yard, and be thoroughly mixed by the feet of cattle during the winter, or in distributing daily the proceeds of the reservoir, should only add enough to the proceeds of the farm to pay his man so employed, he might consider the work done as the most profitably expended of any on his farm, since the benefits are not confined to a single year, or crop, but to many successive ones. There is not capital enough in the shape of labor, usually employed on our farms; and we doubt not, there are many farmers who complain they are losing money by hiring one man, would make money by hiring two. Not, indeed, unless the capital or labor was well directed, and the same may be said of capital employed in any other way.

Farmers in general have little idea of the improvement that might be made in this respect, or the amount of their available means in the matter of manures. There are many farmers in the

country who think they do wonders if they use one hundred and fifty or two hundred loads of manure annually, when they could, and should, if they would consult their own interests, use five hundred or one thousand in the same time. It does not require a large stock to give five hundred loads of compost or manure to the farm, if business is managed right. A single example in proof must suffice, though hundreds might be adduced. Mr. Wm. Clark, Jr. of Northampton, Mass., "keeps an average stock of eight swine, three horses, and eight oxen and cows, and from this stock he made from June 1837 to June 1838, nine hundred and twenty loads of first rate manure, as his excellent crops most abundantly testified. Mr. Clark used for compost three hundred loads of sods, and two hundred and forty-seven loads of swamp muck. His yards were supplied with corn-stalks and refuse hay during the winter, and brakes and weeds during the summer, and cleared out twice during the year."

It is an honor to a man to labor when his efforts are calculated to insure success; but to labor hard when working tends to no profitable results, betrays a want of that forethought and intelligence which should characterize the American farmer.

TO SAVE SEEDS.

From the Southern Agriculturist.

All seeds keep better in their seed vessels, but this can rarely be done, on account of the great space occupied. As soon, therefore, as the pods of cabbages, turnips, radishes, &c., turn brown, and a part become dry, the stems should be cut and laid on a cloth or floor to dry, and afterwards threshed out, and hung up in bags in some open airy place. Lettuces should be pulled up with the roots, as soon as there is the least appearance of maturity, and hung up, and the plants will ripen all of their seeds, nearly at the same time. If left in the garden to ripen, the earliest and best will be lost; in fact, except under very favorable circumstances very few will be obtained, as every shower and every strong breeze will lessen the quantity, and scatter those which are matured over the whole garden. The same course should be pursued with leeks and onions. It is a prevalent opinion that the bush squash cannot be perpetuated among us, as such have a strong tendency to run, and will in one or two seasons become a vine. This is a mistake, and originated, no doubt, in the manner of saving the seed. If the first squashes which appear be retained for seed, there is no danger of the plant running the next season; but if these be used, and those which are borne at the extremities are preserved for this purpose, they will run, and moreover will be later in bearing. To have early fruit of either the squash, cucumber or melon, the very first should be reserved.

From the New Genesee Farmer.

THE ROOT CULTURE.

* * I will now give some account of my own experiments in the root culture. In the first place,

I have become fully convinced of the necessity of having the land free from grass and weeds. In 1838 I sowed about an acre of ruta bags, on good sandy loam soil, somewhat infested with June grass. The land was well prepared, but the weather being moist, the grass was not killed, and it soon sprang up very thickly. This rendered the after culture very difficult and vexatious; and, with all my patient and persevering efforts, I found it impossible wholly to subdue the June grass, and I fully coincide with friend Garbutt in the belief that it would be well for western New York if this grass could be entirely exterminated. From my sad experience with this grassy patch, I became fully determined never to be caught in this same way again.

I last year selected a clean piece of land for my ruta bags crop; ploughed in a dressing of good manure; ploughed it shallow the second time and harrowed it smooth. I then took a light plough and made ridges, about two feet apart. I had no drill-barrow, but took a common wheel-barrow and rolled it along on the top of the ridges, so as to make a small furrow or drill, into which the seeds were sown by hand. A third person followed with a rake, so as to cover the seed, and leave the top of the ridges smooth.

I prepared my seed by putting it into a basin and mixing with it about half a pound of sulphur; because I had read, either in the Farmer or in the Cultivator, a recommendation of sulphur to be used in this way, for the purpose of fixing its flavor in the seed to keep off the fly.

The seed soon sprang up. The turnips were not injured by the fly; and whether it was the sulphur which prevented the depredations of the fly, I know not. The season was not dry, and therefore unfavorable to the propagation of the turnip fly. I thinned the plants to ten or twelve inches apart. They grew rapidly and flourished through the whole season. They were hoed thoroughly twice. They were harvested towards the last of October, and deposited in trenches three feet deep and four wide, and the turnips were raised about a foot above the surface of the earth. However, before putting the turnips into the trench, I put crotches into the middle of the trench, about eight feet apart, and rising above the surface eighteen inches. I laid a ridge pole on the top of these crotches for the purpose of forming a roof, of small sticks, brush and straw, and lastly earth. The roots being stored in this manner, a boy can enter the trench with his basket at any time in the depth of winter, and is never exposed to the inconvenience of a falling roof. Precautionary steps against their heating are always to be taken, by leaving small apertures for the escape of heat and admission of air.

After having produced and stored your crop of ruta bags, what use do you make of them? Hogs that are three or four months old and upwards, will live well on them; but if they are younger, they ought not to be confined exclusively to them. Cooking them renders them much more nutritious for hogs and pigs. They are excellent for cattle and sheep of every age. When sheep are confined for a few weeks in the yard for winter, they pine to be grazing in the field unless they are fed on roots; but when permitted to enjoy this food, they have not half so much hankering for the field.

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I will take the liberty of mentioning one thing, among many others, which may be of considerable use to the inexperienced; and that is, it is of no use to cut up the turnips small and fine for the sheep. Scatter them over the ground or hard snow, and then follow with the shovel and slice them a few times each, for sheep delight much in gnawing the turnip. For two winters I was in the habit of cutting my turnips into small pieces, not larger than a hickory-nut, for my sheep. I have since found this to be entirely unnecessary.

I will furthermore add, for the benefit of the inexperienced, not to dig trenches for the reception of roots where they will be exposed to be filled in with water, when the snow melts, and the earth is filled with water.

One corner of my ground was considerably inclined to clay, and here the turnips were quite small. That kind of soil is wholly unfit for them.

Chili, March 15th, 1840.

P.

DISORDERS OF THE CURRENCY, AND THE REMEDY.

[The following article has more of truth and good sense in it, than twenty wagon loads of the ordinary elaborate newspaper essays and speeches in our legislative bodies, on banking and the disorders of the currency. We concur fully with the writer in his general views of the causes of the enormous evils in connexion with these important subjects; and we do not differ greatly as to the proper and sufficient remedy. For we are as decidedly in favor of *free banking*, as of freedom to every other legitimate and useful branch of industry and trade. It is, however, to the *proper and legitimate* objects of the useful trade of banking and dealing in money that we would give perfect freedom, and afford, equally and justly, every facility to operate that every other business has, or ought to have; but we would by no means add to that freedom the grant of any *exclusive privilege*; and certainly not the all-important one of *coining money* out of paper, to an unlimited extent, and thereby furnishing to the country its exclusive and sole currency. Half the cost of legislation of the country is directly or indirectly incurred for the regulation of banking; and yet, in regard to banking, government (state and federal) has done nothing but sin, both in doing what ought not to be done, and also in omitting what ought to have been done. They have granted exclusive privileges, which never ought to be granted to any bodies or individuals; and they have withheld that proper freedom of action, which all trades ought fully to enjoy.—ED. F. R.]

From the Journal of Commerce.

The discussion about a national bank has died away, and the opinion has become almost universal that such an institution will never again

exist in our country. A very large proportion of the merchants who, a few years ago, were the thorough-going advocates of a national bank, have, after witnessing the mischiefs incident to putting down the late bank, come to the conclusion either that such an institution is not desirable in itself, or if it is, that it must be so dependent upon politics and parties, that another would very likely be overthrown as the two heretofore established have been, and that the convulsion is on the whole, or the danger of it, more to be dreaded than all the benefits of the policy are to be desired. At the same time, there is a very general feeling that our present system of banks is deficient and insecure without some central power to bind it together and produce uniformity of action. Multitudes say "we must have something." But no general sentiment can be obtained in favor of any plan. The various states have expended more legislation on banks and the currency than upon any thing else, and yet there is nothing about which there is so general a feeling that the desideratum has not yet been reached. After all the variety of laws, and systems, and amendments, which have been devised, the impression is as extensive as ever that the arrangements are inadequate to the exigencies of the case. A regulator is wanted.

In Europe, the same state of feeling exists as here. The Bank of England is an object of constant attack. Its movements are watched with intense and dissatisfied interest. Its peculiar privileges have been, and will be still farther diminished. Rivals are rising up who with less responsibility dare talk of defying its power, and the public mind is always deficient of confidence in the wisdom of the bank or its ability to accomplish the object of its creation. It is evident that in England, as well as here, the banking system as it exists does not possess the degree of confidence which enables the public to repose upon it. There is very generally the feeling, that the system is not so good as it might be; that there must be somewhere, among things yet undiscovered, a better way.

It seems strange that this matter cannot be put in a satisfactory shape. The products of the world are brought together, manufactured and distributed, and all the movements of actual goods and chattels carried on by a system which never fails to operate, and to operate in such a way that the whole commercial world are satisfied that nothing better could be devised. The million and a half bales of our cotton are collected together in the seaports, sent forward to the eastern states, to Europe, and wherever else any portion of it may be wanted; the whole quantity is manufactured into numberless articles of comfort and elegance, and returned through the ten thousand channels of consumption, and the whole world is satisfied. So with our mighty crop of bread stuffs. So with all the commodities of the world. Ships are built of the right sizes, and in suitable numbers, and so it is with brigs, schooners, sloops, and boats, steamers, wagons and carts. There is no difficulty about regulating the exchanges of cotton, or flour, or iron, so that the difference in price between the article at one point and another is always kept as small as possible. Wherever there are products to export there are ships ready to carry them away, and bring back other things in exchange. In all this mighty movement about the exchanging of

commodities, there is scarcely a bale of cotton, or a barrel of flour or chest of merchandise, of any sort to be transported a rod, a mile, or ten thousand miles, but there is ready at hand the appropriate carriage to accomplish the design. It is quite certain that all this machinery cannot be made to operate thus by chance, for then all the ships of the world would sometimes assemble in the Gulf of Mexico, and at others in the East Indies. There must be somewhere a great regulator, or such perfect adjustment between demand and supply could not possibly exist. It would be as ridiculous to suppose that all this is done without laws, as to suppose that the sun keeps its centre of the solar system, and all the other bodies theirs, without laws. The laws which work so admirably, must be good laws, and wisely framed. They are not, however, to be found in any of the great tomes in our law libraries. It strikes us as very strange that the whole system which transports all the masses of merchandise, should work so well, and yet that the comparatively little affair of keeping the accounts should make so much trouble and be so difficult, nay almost impossible, to fix in any satisfactory shape. How is it, that a cargo of cotton can be shipped from New Orleans to New York without the least difficulty, and in a manner perfectly satisfactory to all concerned, and yet that the bills of exchange, the mere bits of paper by which the proceeds are reckoned and transferred, can find no satisfactory method by which they can be treated. What is the grand superiority of the system which regulates ships, steamboats, and wagons, and their cargoes? We will tell thee, reader, the secret of the whole matter. It is free.

We wonder that the dangers of a free system of navigation have not attracted the notice of our legislators from the beginning to this day. If government did not see to it, how could it be expected that the vehicles, infinite in variety as well as number, could be provided to transport our immense quantities of merchandise? How could we expect that ships and smaller vessels, steamboats and horse carts, should be every where ready at a moment's notice, unless government should make provision? Again, how dangerous it must have appeared to allow Tom, Dick and Harry, to set up as shippers, wagoners, and carters. Was it not quite apparent, that if irresponsible persons were allowed to go into freighting business, incompetent and fraudulent men would load their ships on freight, and then run off with the goods. What immense frauds, what boundless ruin, must ensue if every body could own ships and freight goods. Thanks to Providence, our legislators have never fallen into these frightful contemplations, for had they, the consequence would no doubt have been, that in the discharge of the first of their duties, they would have passed an act forbidding any man, or body of men, to own, charter or possess any ship or vessel, on pain of the penitentiary. They would no doubt have felt an especial horror of those little boats, shallops and smacks, which so inflate the shipping business, disorganize freights, cause revulsion in the crops, and cheat the poor. Having created a great chasm on the ocean, and perfected the mischiefs they feared, it would of course have been necessary that some provision should be made for the transportation of goods. If the several state

legislatures had then set themselves to create corporations with power to own ships and vessels, steamers, wagons and carts, and to use the same, each company to be under the management of a president and board of directors, until the number of companies had been multiplied to one thousand, and if congress would then have perfected the system by the establishment of one great national freighting company, with a capital of thirty-five hundred ships; if to ensure the accurate working of the system, each state had established a board of commissioners of freighting, and carefully forbidden any company from sending out more than a fixed number of ships, and hampered and clogged the business by forbidding any company ever to take a higher rate of freight than ten cents a cabit foot, whether the voyage be hazardous or safe, ships plenty or scarce—if all this, and ten thousand other provisions, had been established by law, we might have had abundant reason to be satisfied, perhaps, for we should have been fixed about freights, just as we now are about money, and any man who had ten bales of cotton to ship would probably be able to get an answer to his proposition at the semi-weekly meeting of the board of directors, provided he put it in the day beforehand. In our judgment the comparison we have here drawn, is perfectly just and appropriate; and a system such as we have drawn, would be just as well suited to freighting as it is to currency. But who does not turn away from such a system of freighting with contempt? who would not quit business, almost, if he must encounter such a system? What revolutions would it not produce in the rates of freights; and how certain it would be to make the rates on an average twice what they are now. Who would not scorn the folly, idiotic stupidity, of a people who should set about the creation of such a system. What folly above all other folly would it not be, for a people after setting up such a system, to fall upon the work of their own hands with reproaches, to attack the shipping companies as monopolists, and try to make political capital by creating odium against them. Nothing can be plainer, than that the people should blame themselves and no body else, for the bad working of their own bad systems. If, however, such a system were now in full operation in freighting, it might be wise to sustain it. Certainly it would be unwise to break it down suddenly, for the distress growing out of a sudden revolution would be very great. But if it should become broken down, then we think most obviously, the true system should be with all convenient despatch adopted.

And now, with all deference to the opinions of the wise and prudent, we are ready to propose what we have no doubt is a true remedy for the evils of our currency; a remedy which will make our system as perfect as any earthly system can be. It is not that the charters of the banks should be taken away, or any damage or odium upon them. Our banks have done their duty to the country as well as they could; or, at least, as well as was to have been expected. They deserve well of the people. Let them live for ever and prosper. The evils of the banks belong to the system which the people have made; a system which in its nature renders it impossible for the banks to sustain a staple and steady currency. The remedy is the repeal of all prohibitory laws on the subject of bank-

ing and the use of money. Instead of the responsibility of furnishing a currency remaining on our legislators, let them leave the whole matter to the people. If the people cannot contrive ways to keep their accounts, let them guess it out. Let the confused notion about the creation of money being an act of sovereignty, be sent back to Europe where it belongs. Congress having established a standard yard, a standard pound, a standard gallon, and a standard dollar, will have accomplished all the ends of government. In respect to money there is a peculiarity, however, merely physical. The standard pound may be placed in the hands of a public officer in each city, and all the weights of the city may be brought to him, and he can presently adjust them. Not so in money exactly, because it is easier to coin money, than to "seal" it after it is coined. So the easiest way with regard to it will always be for every man to take his bullion to the mint, and let it there be coined. The only useful end accomplished by government in all these matters, is the same throughout, viz.: the establishment and maintenance of uniformity in the standard. There is no more mystery or strange sovereignty in making an eagle, than making the standard gill. It is of the utmost importance that uniformity should reign in respect to both matters. This is all which government is wanted for in either case. Congress has done its duty in establishing the value of coin, and in establishing mints where all future bullion may be turned into coin, at the pleasure of the owner. Let them stay their hand where they are, and let the states repeal all their laws respecting banking, and the use of money, doing nothing more than to enforce contracts, when made, and if there does not instantly grow up, as by magic, a system of currency and banking as much better than the world ever saw, as liberty is better than bondage, then we have overrated the benefits of liberty, and the powers of man set free. We should have banks, then, perhaps more than now, at any rate we should have just as many as were wanted, and just in the form and place which were wanted. We should have a paper currency, good, and known to be so, from Passamaquoddy to the Gulf of Mexico not only, but over the whole commercial world. Our system would never stop specie payments, for there would be no system. Every man or company would stand or fall alone. There would be an end at once to all the feverish excitement about the rates of exchanges and the export of specie. Our currency would be as even and equal, and money affairs as steady, as in this world it is possible to make them, incomparably more steady than at present. The fluctuations would not probably be greater than they are in the rate of freights, not so great in fact—for one of the principal reasons for the fluctuations of freights would be taken away. The currency would be beyond the reach of politicians. They could never disturb it, or create any excitement about it.

From the Agriculturist.

RYE IN WOODLAND.

Mr. F. McGavock, five miles from Nashville, has an excellent pasture from sowing rye in the thick woods last autumn before the falling of the

leaves. If we are not mistaken the grain was put on the surface without ploughing, harrowing, or any other manual operation. The leaves covered it and protected the roots during the freezes of winter, but on the approach of spring it put forth with great luxuriance, and is in every respect one of the best pastures of the country. An advantage not generally thought of in woodland rye is, that if a small portion of it is suffered to mature, nature's laws will effect the second sowing, and by pursuing the plan attentively, a perpetual and permanent pasture may be obtained. To sow rye in land not otherwise employed is, to our minds, the cheapest and best pasture that we have heard of any where.

We think this one idea is worth more than ten years' subscription for the *Agriculturist*, to any one who will try it.

OF LIME AND OTHER MATTERS.

To the Editor of the *Farmers' Register*.

I promised you that I would say something of lime and its influence upon my land and crops. As the season advances, and results begin to unfold, I find it difficult, very difficult, to make my communication. For to say any thing inconsistent with the whole truth I hold to be dishonorable; yet I am not without embarrassment, though thus sustained in saying what I see, feel and believe in relation to lime. If therefore I approach this subject with evident timidity, you and your readers will be so good as to impute my faltering to a decent and becoming respect for public opinion. It is said that "truth is powerful, and must prevail." Be it so; but, after threescore years of experience, I feel much doubt. Yes, sir, I do assuredly doubt that "truth must and will prevail." Like the jesting judge who presided upon the trial of Christ, I ask, "What is truth?" For example, suppose I waited upon every man in Virginia and asked him what was lime and its influence upon the earth in the production of vegetable matter—how many quires of paper would it take to print the answers? Setting aside practical men and men of science, no two would give the same answer. Let me therefore be understood to speak strictly of my practice and its results. My first object was to drain my land; for observation had taught me that a single summer upon wet land would destroy its fertility. Plaster was then a valuable application for 15 years; after that, it only colored the vegetation. Yet, for the good it had done, I continued its use. The hope that, as of old, the spirit might again fall upon the waters and move them, excited me to increased applications of plaster; but it was of no avail. Mother earth seemed to turn the "dull cold ear of death" to me. My spirits flagged, and that *ennui* followed which fixes upon man after parting with an old and faithful friend never to meet again. A deep disgust was fast fixing upon my nerves towards every thing like agriculture. While under this feeling, I wandered into a book store, and there met with your treatise upon "Calcareous Manures." I had made two experiments years before with lime, and they had both failed. Upon reading your book, I resolved to pipe all hands to quarters, and never give up the ship. I forthwith purchased all the shells

I could find, and took good care to avoid that wet kind of land upon which my former experiments had been made. It resulted well, and my march is now in seven league boots. I did not forget my old and valued friend, plaster. I called upon it as endorser for my new acquaintance, lime; and the way they do business is what is called in the west "a caution." Imagination, with very little assistance from poetry, may well believe that it can hear the song of praise and thanksgiving to the great Father of all, from corn, wheat, oats and grass. No "crying rats" are met in the pathway; and recuperated nature, like the hair-grown Samson, returns to her original powers, wantonly desirous of showing her strength. I especially recommend to root growers the free use of lime. For turnips, if they lime and pulverize well, and then cover the seed with a light cultivator, the crop is sure. Lime, sir, is the moving power of all my crops; and that you may form some idea of my doings, I have no doubt of *laying* by my corn by the 15th of June, and having one hundred tons of clover hay cut, cured and stacked. For, after harvest, we look to nothing but thrashing and securing our wheat and oats. The wheat we never fail to deliver to the neighboring mills by the 10th August; and the oats we are sure to consume in the coming year. I say this not to boast, but to show your young farmers what a man of 62 can do. I keep no overseer, for I have found them more unmanageable than wet, rushy land. I have raised and trained my own servants. They know their duty, and do it faithfully. Having had the good fortune of a Christian mother, I was trained in the ways of Christianity, and I treat my servants kindly, and feed them well. No day in the year finds them without meat and fish and milk. Finally, my dear sir, I offer you my warm salutations for your well directed efforts in restoring our beloved state to her pristine power for production. You will long be remembered as a benefactor.

FAIRFAX.

May 10th, 1840.

REARING CHICKENS.

From the Cultivator.

Messrs. Editors—Having made some experiments in the raising of chickens, a business that forms a part of every farmer's occupation, I send you a description, of my present plan of operation, which appears to answer admirably. Under an out-house 16 by 18 feet square, raised 3 feet above the ground, I have dug a cellar, 3 feet below the ground, making the height 6 feet altogether. Eight feet in width of this cellar is partitioned off for turnips, the remaining 10 by 16 feet, being sufficiently large to accommodate 100 chickens, or even more. This cellar is enclosed with boards at present, but it is intended to substitute brick walls in the course of a year or two. The roost is made sloping from the roof to within 18 inches of the ground or floor; 12 feet long by 6 feet wide. The roost is formed in this way: 2 pieces of 2 inch plank, 6 inches wide and 12 feet long, are fastened parallel 5 feet apart by a spike or pin to the joist above, the lower end resting on a post 18 inches above the ground. Notches are made along the upper edge of these plank, 1 foot apart, to receive sticks or poles from the woods, the bark on. When

it is desirable to clean out the roost, the poles being loose are removed; the supports working on a pivot are raised and fastened up, then all is clear, for the work is clearing out. I next provide the chickens with corn, oats and buckwheat, in 3 separate apartments, holding about half a bushel each, which are kept always supplied. They eat less, I find, if allowed to help themselves to what they want than if fed to them in the usual way: for in the latter case each tries to get as much as it can, and thus burdens itself, but finding in the former case that they have abundance, they eat little, and that generally in the morning early, and in the evening going to roost. I have 60 chickens, and they eat about 6 quarts per day of the three kinds of grain, in the proportion of twice as much corn as buckwheat or oats. In the roost is also placed a trough of water, renewed every other day; burnt oyster shells, shell-marl and ashes. A row of nests is constructed after a plan of my own, and does well. It is a box 10 feet long and 18 inches wide; the bottom level, the top sloping at an angle of 45 degrees to prevent the chickens roosting on it; the top opens on hinges. The nests, eight in number, are one foot square; the remaining six inches of the width is a passage way next to the wall, open at each end of the box, and another opening midway of the box. The advantage is to give the hens the *apparent* secrecy they are so fond of.

The following are the advantages of this plan of keeping chickens. By having a roosting place partly under ground, the chickens can keep warmer through the winter than any roost above ground could be made without fire; and this is absolutely necessary to induce them to lay. When fed plentifully in the winter they lay enough eggs to pay for the grain, and in the spring they will repay fourfold. Even now, February 17th, our hens lay enough eggs to pay twice over for the grain they eat. I would recommend this plan to all who wish to make their chickens profitable. As fowls are very troublesome, running about the farm, I propose to enclose a few rods square of ground, with a pale fence 8 feet high, and confine them in that, allowing them occasionally a little more liberty.

Respectfully yours,

E. H. VANUXEM.

Long-Branch, N. J., Feb. 17, 1840.

CALCAREOUS MANURES.

From the Southern Cabinet.

Sir—Attention to the uses of calcareous manures has greatly increased within the last year or two, and many inquire of me as to the appearance, the component parts, and mode of using it on land. I always refer them to Mr. Ruffin's book, and to his valuable periodical publications, for practical instruction. I have various specimens of marl, and of the magnesian lime-stone, found in that portion of our state which ranges within eighty or ninety miles of the sea-coast from North Carolina to Georgia. I now leave some of them at your office for inspection. I believe that it may be found in almost every parish of this portion of the state, and on the banks of most of our water courses. Several valuable beds have been discovered within two years, where they were not previous-

ly known to be, and where they would probably have passed unnoticed, but for the interest lately excited by its valuable effects as a manure in Virginia, New Jersey, and elsewhere. I have seen it in St. Matthew's parish, at Pinckney's ferry, and Caldwell's plantation, near McCord's ferry, and in the neighborhood of Manchester. I have heard of it in Barnwell near the Lower Three Runs, and on the Pee Dee river below Society Hill: but do not know of its having been found above this line, until we come to the fine limestone rock in Spartanburgh.

Most of what I have seen can be dug very near the surface of the earth, and reduced to powder with very little trouble—some will moulder into powder by drying in the weather. The harder kind requires burning and slacking like lime, to make it fine enough for manure. In this state I am disposed to believe that it is peculiarly suited to cold, clayey, stiff soils. The fossil shells, large and small, and the marine shells on the sea-coast, of course require to be burned and slacked before they can be used as manure.

The following results were obtained from some of the specimens analyzed—each one hundred grains:

	Lime.	Magnesia.	Clay and sand.
Dr. P. G. Prioleau's,			
on Wassamasaw	50 grs.	40 grs.	6 grs.
Do., at Isaac Brad-			
well's - - - -	33	45	8
Isaac Bradwell's, on			
Four Holes - -	50	28	10
J. J., near Inabnet's,			
on do. - - - -	19	63	11
John Brisbane's,			
Ashley river - -	41	27	24
Do., High-land	34	40	23
C. G. Capers, St.			
Helena Island -	38	25	28
J. J., Indian-field			
creek - - - -	30	30	35
Frederick Porcher, near the Santee canal.			
Mrs. Laurens, near Mepkin bridge.			

Dr. P. G. Prioleau, near Biggin bridge; and several others not preserved.

The result is from twenty to fifty per ct. of lime, and from twenty-five to sixty-three per ct. of magnesia. If, as some believe, the magnesia is as valuable as the lime, in this earth as a manure, then may we account for its fine effects, for we have of the two united from sixty to ninety per ct. of active ingredients in the marl. Some have been discouraged from the use of marl, by observing that the stony lumps of hard marl have been for ages ploughed up in some fields that are still poor and unproductive. We believe that if these gentlemen would make the old negroes and children collect these stones, and either beat them as fine as brick dust, or burn them, so that they could be easily pulverized and intermixed with the soil, then the produce of their barren fields would be increased ten per cent. the first year, fifty per cent. the second year, and progressively increased every year to three hundred or four hundred per cent. beyond what they now obtain. It may be asked by some, what are they to do who cannot readily procure marl? We refer them to the analysis of marls, that they may obtain a substance as near as possible to the nature of marl. The marls of Europe and the north, consist almost en-

tirely of clay and lime, in various proportions, but generally about one-third of lime and two-thirds of clay.* Marsh-mud is valuable because it contains both of these, although the lime is in small proportions. Add lime or dead shells to marsh-mud, and you make a very complete marl. Clay is found in vast quantities near all our sandy lands: if this alone were spread and intermixed, it would stiffen the soil, and enable it to retain the moisture which now passes rapidly through it and does but little good to the crop. Let some lime be added to this clay and you have marl. So also with the mud from ponds, creeks, swamps, bays and branches, that run in or near to every field. If lime be added to these last, you not only have marl but decayed vegetable manure also.

Mr. Ruffin says, that two to three hundred bushels of marl to the acre, thrown broad-cast, is generally the best proportion. I obtained very satisfactory results from sixty and ninety bushels to the acre when put into the hills with the corn; the produce would probably have been greater, if I had increased the proportion of marl.

I think that Mr. Ruffin has fallen into one error, from his not being sufficiently acquainted with chemistry, an unfortunate error, as it excites doubts of all the benefits ascribed by him to lime. He gives the analysis of some lands which he says contain no lime whatever, and yet they are very productive and rich. If Mr. Ruffin would add with his own hands any quantity of sulphate of lime, or of oxalate of lime, to this very soil, the result would be the same, with the tests that he used. His tests cannot detect these preparations of lime, and yet they are believed to be the most powerful forms in which lime can be applied to vegetation. The effects of sulphate of lime, gypsum, or plaster of Paris, are well known, and it exists in many soils by a process of nature. So, no doubt, does the oxalate of lime, formed by the decomposition of oxalis (sorrels,) rumex (docks,) and other weeds growing luxuriantly on such lands, the acid of which unites to the lime wherever found, and then it can only be discovered after exposure to the heat.

Your most obedient servant,

Jos. JOHNSON.

Charleston, April 2d, 1840.

I have reason to believe, that calcareous manures are this year used pretty extensively by five or six planters, and tried as experiments by as many more.

J. J.

[We rejoice to learn from the above article, that marl has been employed by the planters of South Carolina, even to the slight extent stated. We have formerly several times referred to the rich resources of that state for its agricultural improvement; and, even to the last time, expressed regret that they were *entirely* neglected. But if even "five or six planters" are this year making *proper* applications of marl in South Carolina,

* Not so as to the marls of lower Virginia, which it is presumed are meant to be included in the above remark. Very few of these contain much clay; and their earth, other than carbonate of lime, is mostly of silicious sand.—Ed. F. R.

it must lead to extensive and general improvement by that means.

The large proportion of [carbonate of] magnesia which Dr. Johnson reports as so generally present in the marls of South Carolina, is a remarkable and interesting fact, which requires attention and full investigation. Writers of reputation have maintained that magnesia is hurtful to land. We have no experience on that head, but do not concur in that opinion.

Next, as to matters personal: If the writer of the above article had merely charged, in general terms, the author of the 'Essay on Calcareous Manures,' as "not being sufficiently acquainted with chemistry," no reply would have been made, because that fact has been fully and expressly admitted by himself in the work in question. But as it is charged that a particular "error" is the effect of that want of sufficient knowledge, and that that error is so important as to "excite doubts of all the benefits imputed by the author to lime," it is proper to say, that the error charged has no existence; and that Dr. Johnson either has not read, or has not understood the reasoning of the work, which he speaks of so approvingly in other respects. The author did indeed state that very many of the most fertile soils, and indeed almost all soils, rich and poor, of all the great Atlantic slope of the United States, were totally destitute of carbonate of lime; and he still maintains this important proposition, which he was the first to announce. But so far from asserting the absence of lime, in all or any other combinations, directly the reverse was maintained; and the ground thus assumed forms an important and essential part of the theory of the causes of fertility or barrenness of soils. To establish this general existence of lime in some other state of combination than the carbonate in all rich soils is the main object of the reasoning and proofs in the chapter on "neutral and acid soils," (page 22, second edition,) and the truth there established is relied on to sustain the subsequent reasoning throughout, and is particularly referred to, in several cases, for explanation of particular and remarkable effects. Two of them, now remembered, are in the chapter on the "permanency of calcareous manures" (p. 58,) and the explanation of the inaction of gypsum on acid (or ordinary poor natural) soils. (p. 92.)—Ed. F. R.]

VALUE OF ASHES.

From the Cultivator.

Messrs. Gaylord and Tucker—From observation and actual experiment, I have come to the conclusion that leached ashes are worth at least six cents per bushel, to incorporate into a gravelly

soil; and that unleached are worth four times as much as leached. Care should be taken to mix unleached ashes well with the soil. This fact shows the impolicy of farmers selling their ashes for 12½ cents per bushel. J. TOWNER.

PIGS.

From the Maine Cultivator.

Mr. Editor :—As the raising of pigs is a thing of considerable importance, I will state how I lost a fine litter two years since, when they were three weeks old. I put into their pens some chaffy wheat straw. The pigs went to rooting and champing it. They were taken sick, they lived from one to three weeks, the beads they swallowed, doubtless caused their death. My brother had a pig in the fall, his pen was wet, and he threw in a bushel of wheat chaff, his pig eat some of it, and died soon after. I knew a man who had a fat hog that eat some of his wheat chaff, the next day he was taken with vomiting, and he killed him, and on examining his swallow he found it coated with beads of wheat which caused his death. Oat straw is perfectly safe.

FRANCIS WINGATE.

DURHAM CATTLE.—AT WHAT AGE BEST TO IMPORT THEM—WILL THRIVE ON OUR WORST PASTURES—AND MAY BE BRED FROM AT ONE YEAR OLD.

From the Southern Cabinet.

Dear Sir—Having read several articles in your paper on the Durham cattle, I write you this to add to the mass of information already presented to the public. The experience of your other friends differs so entirely from my own, that I am inclined to believe some of us have fallen into error. It is affirmed that the Durhams are too delicate in construction, require more feed, and in all other respects are more unsuited to our climate than the other breed of cattle. My experience is directly the other way. For the last six years I have seen many Durhams, Devons, and some Ayrshire, imported into Charleston and its vicinity. Under proper treatment they have all of them fulfilled here the respective characteristics they have always borne elsewhere. Under improper treatment they have all of them suffered from delicacy of constitution, &c. All cattle imported from abroad, to become acclimated, must undergo the same changes of constitution as foreigners coming for the first time amongst us. If you expect cattle from Europe, where they are generally housed, and fed on the richest and best of food, to keep healthy and fat, when turned out upon our razor-shaved meadows, and corn-stalk fields, you will be sadly disappointed, and even when housed and well fed, if you expect them not to pant during our summers, and to die under the influence of our noxious climate, you will be as much out of the way, as to look for health and beauty on the cheek of a mountain lass working amid the miasma of our low country rice-fields.

Most of us, at a very high price, import the Durham cattle when full grown. Their constitu-

tions have been already formed and accustomed to the climate whence they came, and it is impossible for them to undergo the radical and necessary change required here. Were we to import at a younger age, the result would be different. Out of twenty or thirty bulls and cows imported from Europe, the north, and Kentucky, during the past year, I know of but three or four now surviving. Out of the same number of calves, I know of as few that have not stood our climate.

But to the point from which I have diverged. About three years since I purchased in Charleston a Durham bull-calf one year old. I turned him among my commons cattle, and only housed and fed him at night. He survived the summer, and is now perhaps one of the finest bulls in this state. Having supplied myself with several of his get, I sold him to Jenkins Mikell, esq., of Edisto Island, who assures me that although he has turned him upon nothing but the common marsh pastures of his island, he has all the year kept fatter and in better health than any of his common cattle. By this bull, when but eighteen months old I got twelve calves. The pasture upon which they have fed is a bad one, and yet these calves have kept fat, and are (I speak with due care,) twice as large as calves of other cows by common bulls. I have several calves from this bull, which though but one year old, are as large as their mothers. I now own a white Durham bull dropped two years since from a very beautiful Durham cow imported by Col. Hampton. I raised him from the bottle, until six months old, and then turned him out to pasture, feeding him at night as I did my other cattle. At one year old I put him to sixteen of my cows, and this season have sixteen of his calves. Though from common Carolina cows, every one who has seen these calves has been struck with their superior beauty of form, and enlarged size, when compared with the common breed. That I have not taken up a partial opinion, let the following fact speak. One of these calves from a very inferior cow, I sent to market with two other calves from good cows, though by a common bull. The calf by the Durham bull, though four weeks younger, brought twelve dollars, while the other two brought only eight dollars apiece. I hesitate nothing in saying, upon my own experience, and upon information collected from several of my friends who are competent to speak, that the Durham feed closer, live on coarser food, grow larger, and give more milk than any other cattle which can be produced in our climate. Their butteraceous qualities, like that of all other breeds, depend upon the butteraceous qualities of the food they get. If you feed them to give much milk, expect them to give less butter, and vice versa. I owned a Durham cow, which by a particular mode feeding, I could make give thirty quarts of milk per day, and yet the same milk would not yield as much butter as when I fed her to give but twelve or fourteen quarts. I have some calves from the most beautiful Devon bull ever brought to this state. They are fine calves, but not so good as the Durhams.

I have a full blooded Durham heifer two years old. It has been raised entirely upon one of the poorest pastures in the low-country. For size, beauty, and every other qualification, I can safely put it against any full grown Devon, Ayrshire, or other cow, I have ever seen. I must distinctly re-

peat, that this calf has lived on the common pasture. It has scarcely ever tasted grain. Both it and the young bull I own, live on the same pasture with my other cows, and are more thrifty.

It is said that to have these cattle in perfection you must feed them high and attend them well. So you must; but in the low country where we must have a large flock of cattle, we cannot afford to do so. Must we on that account have nothing to do with the breed? I think not. If we cannot have this cattle in the perfection they are found in Europe, we may nevertheless introduce them to improve our common breed, and any one who will take this view only, will attain much.

We all know how much a cross of breeds will do for cattle; and it is from the want of this as much as from any other cause that our native stock have degenerated so much. Under the very best system of attention and feeding, if you do not frequently cross the breed and relationship of animals they will degenerate in size and quality. There are few plantations in South Carolina, where this fact, though so notoriously obvious, has been attended to, and the proper correctives applied. For one hundred dollars, a Durham calf of the purest breed can be delivered in Charleston. At one year of age he is fit to put to cows, and from what I have seen I think the get of bulls at this age the best. I have tried them from one to five years of age, and find the calves of the former always the finest in form and size, and have satisfied some of the most skeptical upon this point. When I first advanced this I was laughed at, because contrary to the supposed experience of the country. I say supposed experience, because the custom was only founded on supposition. Every one who will pay attention to the matter, will find, that even among his common cattle the finest calves are invariably by his youngest bulls. My old cow-driver, who has had forty years' experience, vouches this truth. I am opposed to none of the other breed of cattle; they are all excellent of their kinds. The object of this hurried letter is to prove that the introduction of fine cattle amongst us, will improve our native breeds, and that, too, on the very worst of pastures. Dr. O'Hear and Dr. Harleston of this parish, have with myself bred from Durham bulls, for the last few years, and we are now fully convinced that the calves thus bred have suffered drought, inattention, and I may actually say, *starvation*, better than calves from the native breed. The gentlemen whose names I have used, will excuse the liberty herein taken. I do it for the confirmation of truth.

Respectfully yours, &c.,

B. R. CARROLL.

[From 'Transactions of the Essex Agricultural Society.']

ON EXPERIMENTS ON MANURES.

To the trustees of the Essex Agricultural Society.

Gentlemen—The only claim to which the attention of the committee on experiments on manures has been called, is that of Dr. Andrew Nichols, of Danvers. His farm in Middleton was visited in July and September. Early in the spring he had caused unleached wood-ashes to be spread on low and cold soils, and the crops of grass gave

evidence that the application was very favorable. It had produced a heavy burden of grass on land which otherwise would have had but a light and sour crop.

His corn was manured with a compost made of a small portion of animal manure, seventy bushels of ashes and meadow or peat mud. The soil is a sandy loam. The growth in July was luxuriant, and in September there was a handsome display of full-grown, well-filled ears, in the judgment of the committee about fifty bushels to the acre. This in some circumstances would not be considered a large yield, but the soil is naturally light and for many years had not been well manured. The committee were satisfied by the appearance of the crop, that this year the proper manure and good treatment had been applied, and that in ordinary seasons a compost of ashes, meadow mud and barn manure, will, on sandy and loamy soils, produce a fair crop of corn. In the locality of Dr. Nichols's farm, it would be difficult and expensive to procure animal manure in sufficient quantities to plant any considerable extent of land, and we know of no cheaper or better substitute.

The attention of the committee was also directed to a piece of barley, on which a solution of potash and peat mud had been applied, and the quantity of straw and grain appeared to have been doubled by the operation. But the advantages of this application were still more apparent on a small portion of land on which onions had been sown. Although it was not in proper tilth for such a crop, it produced at the rate of six hundred and forty bushels to the acre. On a small part of the land none of the solution had been used; here, the crop was very light, giving evidence that the superiority of the crop was owing to the novel application.

The subject is important to farmers. Manure is the capital on which they do business. And the man who teaches them how to obtain it at a reasonable rate and in sufficient quantities, does the public better service, than if he lectured the live-long day on copper and silver mines, and amused the sleepy hours with golden dreams.

The committee think Dr. Nichols's experiment valuable, and his statement satisfactory; they recommend that it be published, and that the society's premium of twenty dollars be awarded to him.

For the committee,

DANIEL P. KING.

Danvers, Dec. 28, 1839.

Dr. A. Nichols's statement. To the committee of the Essex Agricultural Society on manures.

Persuaded of the importance of the discoveries made by Dr. Samuel L. Dana, of Lowell, and given to the world through the medium of the reports of Professor Hitchcock and Rev. H. Colman, to the legislature of Massachusetts, concerning the food of vegetables, grain, and the abundance of it in peat mud, in an insoluble state to be sure, and in that state not readily absorbed and digested by the roots of cultivated vegetables, but rendered soluble and very easily digestible by such plants by potash, wood-ashes, or other alkalies, among which is ammonia, one of the products of fermenting animal manures, I resolved last year to

subject his theories to the test of experiment the present season. Accordingly I directed a quantity of black peat mud, procured by ditching for the purpose of draining and reclaiming an alder swamp, a part of which I had some years since brought into a state highly productive of the cultivated grasses, to be thrown into heaps. During the winter I also had collected in Salem, 282 bushels of unleached wood-ashes, at the cost of 12½ cents per bushel. These were sent up to my farm, a part to be spread on my black soil grass lands, and a part to be mixed with mud for my tillage land. Two hundred bushels of these were spread on about six acres of such grass land while it was covered with ice, and frozen hard enough to be carted over without cutting it into ruts. These lands produced from one to two tons of good merchantable hay to the acre, nearly double the crop produced by the same lands last year. And one fact induces me to think, that being spread on the ice, as above mentioned, a portion of these ashes was washed away by the spring freshet. The fact from which I infer this is, that a run below, over which the water coming from the meadow, on which the largest part of these ashes were spread, flows, produced more than double the quantity of hay, and that of a very superior quality to what had been ever known to grow on the same land before.

Seventy bushels of these ashes, together with a quantity not exceeding thirty bushels of mixed coal and wood ashes made by my kitchen and parlor fires were mixed with my barn manure, derived from one horse kept in stable the whole year, one other horse kept in stable during the winter months, one cow kept through the winter, and one pair of oxen employed almost daily on the road and in the woods, but fed in the barn one hundred days. This manure was never measured, but knowing how it was made, by the droppings and litter or bedding of these cattle, farmers can estimate the quantity with a good degree of correctness. These ashes and this manure were mixed with a sufficient quantity of the mud above mentioned by forking it over three times, to manure three acres of corn and potatoes, in hills four feet by about three feet apart, giving a good shovel full to the hill. More than two-thirds of this was grass land, which produced last year about half a ton of hay to the acre, broken up by the plough in April. The remainder was cropped last year without being well manured, with corn and potatoes. Gentlemen, you have seen the crop growing and matured, and I leave it to you to say whether or not the crop on this land would have been better had it been dressed with an equal quantity of pure, well rotted barn manure. For my own part I believe it would not, but that this experiment proves that peat mud, thus managed, is equal, if not superior, to the same quantity of any other substance in common use as a manure among us; which, if it be a fact, is a fact of immense value to the farmers of New England. By the knowledge and use of it, our comparatively barren soils may be made to equal or excel in productiveness the virgin prairies of the west. There were many hills in which the corn first planted was destroyed by worms. A part of these were supplied with the small Canada corn, a part with beans. The whole was several times cut down by frost. The produce was three hundred bushels of ears of sound corn,

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two tons of pumpkins and squashes, and some potatoes and beans. Dr. Dana, in his letter to Mr. Colman, dated Lowell, March 6, 1839, suggests the trial of a solution of geine as a manure. His directions for preparing it are as follows: "Boil one hundred pounds of dry pulverized peat with two and a half pounds of white ash, (an article imported from England,) containing 36 to 55 per cent. of pure soda, or its equivalent in pearl-ash or potash, in a potash kettle, with 130 gallons of water; boil for a few hours, let it settle, and dip off the clear liquor for use. Add the same quantity of alkali and water, boil and dip off as before. The dark colored brown solution contains about half an ounce per gallon of vegetable matter. It is to be applied by watering grain crops, grass lands, or any other way the farmer's quick wit will point out."

In the month of June I prepared a solution of geine, obtained not by boiling, but by steeping the mud as taken from the meadow, in a weak lie in tubs. I did not weigh the materials, being careful only to use more mud than the potash would render soluble. The portion was something like this: peat 100 lbs., potash 1 lb., water 50 gallons; stirred occasionally for about a week, when the dark brown solution, described by Dr. Dana, was dipped off and applied to some rows of corn, a portion of a piece of starved barley, and a bed of onions sown on land not well prepared for that crop. The corn was a portion of a piece manured as above mentioned. On this the benefit was not so obvious. The crop of barley on the portion watered was more than double the quantity both in straw and grain to that on other portions of the field, the soil and treatment of which was otherwise precisely similar.

The bed of onions which had been prepared by dressing it with a mixture of mud and ashes previous to the sowing of the seed, but which had not by harrowing been so completely pulverized, mixed and kneaded with the soil as the cultivators of this crop deem essential to success, consisted of three and a half square rods. The onions came up well, were well weeded, and about two bushels of horse manure spread between the rows. In June, four rows were first watered with the solution of geine above described. In ten days the onions in these rows were nearly double the size of the others. All but six rows of the remainder were then watered. The growth of these soon outstripped the unwatered remainder.

Mr. Henry Gould, who manages my farm on shares, and who conducted all the foregoing experiments, without thinking of the importance of leaving at least one row unwatered, that we might better ascertain the true effect of this management, seeing the benefit to the parts thus watered, in about a week after treated the remainder in the same manner. The ends of some of the rows, however, which did not receive the watering, produced only very small onions, such as are usually thrown away as worthless by cultivators of this crop. This fact leads me to believe that if the onions had not been watered with the solution of geine, not a single bushel of a good size would have been produced on the whole piece. At any rate, it was peat or geine, rendered soluble by alkali, that produced this large crop.

The crop proved greater than our most sanguine expectations. The onions were measured in the

presence of the chairman of your committee, and making ample allowance for the tops which had not been stripped off, were adjudged equal to four bushels to the square rod, or at the rate of 640 bushels to the acre. In these experiments 7 lbs. of potash, which cost 7 cents a pound bought at the retail price, were used. Potash, although dearer than wood-ashes at 12½ cents per bushel, is, I think, cheaper than the white ash mentioned by Dr. Dana, and sufficiently cheap to make with meadow mud, a far cheaper manure than such as is in general used among our farmers. The experiment satisfies me that nothing better than potash and peat can be used for most, if not all our cultivated vegetables, and the economy of watering with a solution of geine, such as are cultivated in rows, I think cannot be doubted. The reason why the corn was not very obviously benefited, I think, must have been that the portion of the roots to which it was applied was already fully supplied with nutriment out of the same kind from the peat ashes and manure put in the hill at planting. For watering rows of onions or other vegetables, I should recommend that a cask be mounted on light wheels, so set that like the *drill* they may run each side of the row and drop the liquid manure through a small tap hole or tube from the cask, directly upon the young plants. For preparing the liquor, I should recommend a cistern about three feet deep and as large as the object may require, formed of plank and laid on a bed of clay and surrounded by the same, in the manner that tan vats are constructed; this should occupy a warm place, exposed to the sun, near water, and as near as these requisites permit to the tillage lands of the farm. In such a cistern, in warm weather, a solution of geine may be made in large quantities, with little labor and without the expense of fuel, as the heat of the sun is, I think, amply sufficient for the purpose.* If from further experiments it should be found economical to water grass lands and grain crops, a large cask or casks placed on wheels, and drawn by oxen or horse power, the liquor from the casks being at pleasure let into a long narrow box, perforated with numerous small holes, which would spread the same over a strip of ground, some 6, 8, or 10 feet in breadth, as it is drawn over the field, in the same manner as the streets in cities are watered in summer.

ANDREW NICHOLS.

I certify that I measured the piece of land mentioned in the foregoing statement, as planted with corn, on the 21st of September, 1839, and found the same to contain two acres, three quarters, thirty-one rods. JOHN W. PROCTOR, Surveyor.

From Hayward's Science of Agriculture.

HAYMAKING.

Having observed, that in a season where there was no rain whatever, and the hay had been made with rapidity, and carried within a short time after it had been cut, that a greater quantity had been injured by being over-heated and burnt, than in a

catching, irregular season; that when hay had not heated in the stack, it was frequently mouldy; that as hay lost its native green color and approached a brown, it lost its nutritive qualities; and that, altogether, the making of hay, as usually conducted, was a very precarious and troublesome operation; I determined on trying to arrange a system on more regular and certain principles, and in which I succeeded: and by adopting a certain and regular course of operations, was enabled to make my hay of a uniform good quality; and, let the weather be as it might, at a pretty regular expense for labor, and considering such a process not only of importance, as it insures a more perfect quality, but as it affords a more certain protection against the injuries usually consequent on the uncertainty of the weather, and over-heating in the stack, and that it thus removes two great causes of anxiety, it may be well worth the public attention.

In the first place, then, as to the state of the weather—it generally happens at this season of the year, that there are three or four rainy and three or four dry days;* therefore, on beginning to cut the grass, as it is well known that grass may be cut and suffered to remain in the sward for several days without injury; and it being desirable, where hands are plenty, to have a good quantity, or as much as will complete a stack in a day, in the same state of forwardness, I should prefer, rather than to wait for fine weather, to begin to cut in rainy weather. However, be this as it may, the swaths should not be opened but on a fine day, and when this is done, the grass should be well shaken apart and equally spread over the ground; and as soon as the upper surface is dry, turn it well over, and in this operation great care should be taken to open and spread any cocks that may not have been divided in the first opening: this being done, commence raking into wind-rows in time, that the whole may be made into small cocks before the night. *The second day these cocks must remain untouched, let the weather be wet or dry.* the third day, if the weather be certain and fine, throw the cocks open; but if the weather be wet or threatening, they may remain another day, or until the weather is certain to be fine for the day. The cocks should then be thrown, according to the crop, into beds of two or three rows, and after three or four hours' exposure, turned over, and taking time to gather the whole into wind-rows and cocks before night; let this operation commence accordingly, and *none be left open.* The day after this, which in fine weather will be the fourth, *the cocks must again remain untouched, or not be opened, whether the weather be wet or dry.* On the fifth, or the next dry day, these cocks will only require to be opened for an hour or two, after which time they will be fit for the stack.

The novelty of this mode, consists only in suffering the hay to remain in cock the second or third, or alternate days; and at first sight it may appear that so much time in fine weather must be lost, but this is by no means the case, for whilst the hay remains in cocks, a slight fermentation, or what is termed sweating, will take place; and in consequence, after it has been opened on the third and fifth days, it will prove to be just as forward as if it had been worked every day; and the advantages resulting from this, are obviously the following:

* Perhaps in an excavation in a peat meadow, which would fill with water spontaneously, a solution of geine might be still more cheaply obtained, by simply adding potash, ashes, &c. to the stagnant water,

* In England.

by shortening the time of open exposure, the color of the hay is more perfectly preserved, and consequently, the quality; and the fermentation or sweating which takes place in the cocks, proves so much to have diminished the principle or inclination, as to prevent its heating injuriously in the stack; and the whole operation of making, whether it takes four days or eight, requires three days' labor only; and the hay being left in that state every night, in which it is the least possibly exposed to injuries of the weather, and in which it may remain for a day or two in uncertain weather without injurious exposure, most painful anxiety and useless attendance of labors are obviated.

SPEECH OF DANIEL WEBSTER, ESQ.

*At an Agricultural Meeting in Boston.**

Mr. Webster began with stating that he regarded agriculture as the leading interest of society; and as having, in all its relations, a direct and intimate bearing upon human comfort and the national prosperity. He had been familiar with its operations in his youth; and he had always looked upon the subject with a lively and deep interest. He did not esteem himself to be particularly qualified to judge of the subject in all its various aspects and departments; and he neither himself regarded, nor would he have others regard his opinions as authoritative; but the subject had been one of careful observation to him, both in public and private life; and his visit to Europe, at a season of the year particularly favorable for this purpose, had given him the opportunity of seeing its improved husbandry, and as far as it might be interesting, or would have a bearing upon the subject of the evening's discussion, the agriculture of Massachusetts, he would, as the meeting appeared to expect, say a few words upon what had attracted his notice.

How far, in a question of this kind, the example of other countries was to be followed, was an inquiry worthy of much consideration. The example of a foreign country might be too closely followed. It would furnish a safe rule of imitation only as far as the circumstances of the one country correspond with those of the other.

The great objects of agriculture, and the great agricultural products of England, and of Massachusetts, are much the same. Neither country produces olives, nor rice, nor cotton, nor the sugar cane. Bread, meat and clothing are the main productions of both. But although the great productions are mainly the same, yet there are many diversities of condition and circumstances and various modes of culture.

The primary elements which enter into the con-

sideration of the agriculture of a country are four; climate, soil, price of land, and price of labor. In any comparison, therefore, of the agriculture of England with that of Massachusetts, these elements are to be taken particularly into view.

The climate of England differs essentially from that of this country. England is on the western side of the eastern, and we on the eastern side of the western continent. The climate of each country is materially affected by its respective situation in relation to the ocean. The winds, which prevail most, both in this country and in England are from the west; it is known that the wind blows, in our latitudes, from some point west to some point east, on an average of years nearly or quite three days out of four. These facts are familiar. The consequences resulting from them are, that our winters are colder and our summers much hotter than in England. Our latitude is about that of Oporto, yet the temperature is very different. On these accounts, therefore, the maturing of the crops in England and the power of using these crops, creates a material difference between its agriculture and ours. It may be supposed that our climate must resemble that of China in the same latitudes; and this fact may have an essential bearing upon that branch of agriculture which it is proposed to introduce among us, the production of silk.

The second point of difference between the two countries lies in the soil. The soil of England is mainly argillaceous; a soft and unctuous loam upon a substratum of clay. This may be considered as the predominant characteristic in the parts which he visited. The soil in some of the southern counties of England is thinner; some of it is what we should call stony; much of it is a free gravelly soil, with some small part which with us would be called sandy. Through a great extent of country this soil rests on a deep bed of chalk. Ours is a granite soil. There is granite in Great Britain; but this species of soil prevails in Scotland, a part of the country which more resembles our own. We may have lands as good as any in England. Our alluvial soils on Connecticut river, and in some other parts of the country, are equal to any lands; but these have not, ordinarily, a wide extent of clay subsoil. The soil of Massachusetts is harder, more granitic, less abounding in clay, and altogether more stony, than the soil of England. The surface of Massachusetts is more uneven, more broken with mountain ridges, more diversified with hill and dale, and more abundant in streams of water, than that of England.

The price of land in that country, another important element in agricultural calculations, differs greatly from the price of land with us. It is three times as high as in Massachusetts, at least.

On the other hand, the price of agricultural labor is much higher in Massachusetts, than in England. In different parts of England the price of labor is considerably various; but it may be set down as twice as dear with us here.

These are the general remarks, which have suggested themselves in regard to the state of things abroad. Now have we any thing to learn from them? Is there any thing in the condition of England, applicable to ours; or, in regard to which, the agriculture of England may be of use to Massachusetts and other countries.

The subject of agriculture in England has

* This speech, as first furnished in the reporter's notes, has been published in most of the agricultural papers of the United States. It has since been revised and corrected by its author, and republished in pamphlet form by the original reporter, the Rev. Henry Colman, the Agricultural Commissioner of Massachusetts, together with an appendix by the latter. It is the last edition that is here copied.—ED. F. R.

strongly attracted the attention and inquiries of men of science. They have studied particularly the nature of the soil. More than twenty years ago, Sir Humphry Davy undertook to treat the subject of the application of chemical knowledge to agriculture in the analysis of soils and manures. The same attention has been continued to the subject; and the extraordinary discoveries and advances in chemical science, since his time, are likely to operate greatly to the advantage of agriculture. The best results may be expected from them. These inquiries are now prosecuted in France with great enthusiasm and success. We may hope for like beneficial results here from the application of science to the same objects.

But although the circumstances of climate and situation and nature of the soil form permanent distinctions, which cannot be changed, yet there are other differences, resulting from different modes of culture, and different forms of applying labor; and it is to these differences that our attention should be particularly directed. Here, there is much to learn. English cultivation is more scientific, more systematic, and more exact, a great deal than ours. This is partly the result of necessity. A vast population is to be supported on comparatively a small surface. Lands are dear, rents are high, and hands, as well as mouths, are numerous. Careful and skilful cultivation is the natural result of this state of things. An English farmer looks not merely to the present year's crop. He considers what will be the condition of the land, when that crop is off; and what it will be fit for, the next year. He studies to use his land, so as not to abuse it. On the contrary, his aim is to get crop after crop, and still the land shall be growing better and better. If he would content himself with raising from the soil a large crop this year, and then leaving it neglected and exhausted, he would starve. It is upon this fundamental idea of constant production without exhaustion, that the system of English cultivation, and indeed of all good cultivation, is founded. England is not original in this. Flanders, and perhaps Italy have been her teachers. This system is carried out in practice, by a well considered rotation of crops. The form, or manner of this rotation, in a given case, is determined very much by the value of the soil, and partly by the local demand for particular products. But some rotation, some succession, some variation in the annual productions of the same land, is essential. No tenant could obtain a lease, or if he should, could pay his rent and maintain his family, who should wholly disregard this. White crops are not to follow one another. White crops are wheat, barley, rye, oats, &c. Our maize, or Indian corn, must be considered a white crop; although from the quantity of stalk and leaf which it produces, and which are such excellent food for cattle, it is less exhausting than some other white crops; or to speak more properly, it makes greater returns to the land. Green crops are turnips, potatoes, beets, vetches or tares, (which are usually eaten while growing, by cattle and sheep or cut for green food,) and clover. Buck or beech wheat, and winter oats, thought to be a very useful product, are regarded also as green crops, when eaten on the land; and so indeed may any crop be considered, which is used in this way. But the turnip is the great green crop of England. Its cultivation has wrought such

changes, in fifty years, that it may be said to have revolutionized English agriculture.

Before that time, when lands become exhausted by the repetition of grain crops, they were left, as it was termed, fallow; that is, were not cultivated at all, but abandoned to recruit themselves as they might. This occurred as often as every fourth year, so that one quarter of the arable land was always out of cultivation and yielded nothing. Turnips are now substituted in the place of these naked fallows; and now land in turnips is considered as fallow. What is the philosophy of this? The raising of crops, even of any the most favorable crop, does not in itself enrich, but in some degree, exhausts the land. The exhaustion of the land, however, as experience and observation have fully demonstrated, takes place mainly when the seeds of a plant are allowed to perfect themselves. The turnip is a biennial plant. It does not perfect its seed before it is consumed. There is another circumstance in respect to the turnip plant, which deserves consideration.

Plants, it is well understood, derive a large portion of their nutriment from the air. The leaves of plants are their lungs. The leaves of turnips expose a wide surface to the atmosphere, and derive, therefore, much of their subsistence and nutriment from these sources. The broad leaves of the turnips likewise shade the ground, preserve its moisture, and prevent, in some measure, its exhaustion by the sun and air.

The turnips have a farther and ultimate use. Meat and clothing come from animals. The more animals are sustained upon a farm, the more meat and the more clothing. These things bear, of course, a proportion to the number of bullocks, sheep, swine, and poultry which are maintained. The great inquiry then is, what kind of crops will least exhaust the land in their cultivation, and furnish, at the same time, support to the largest number of animals?

A very large amount of land in England is cultivated in turnips. Fields of turnips of three, four, and even five hundred acres are sometimes seen, though the common fields are much less; and it may be observed here, that in the richest and best cultivated parts of England, enclosures of ten, fifteen, twenty, or thirty acres, seemed more common. Since the introduction of the turnip culture, bullocks and sheep have trebled in number. Turnips, for the reasons given, are not great exhausters of the soil; and they furnish abundant food for animals. Let us suppose, that one bushel of oats or barley may be raised at the same cost as ten bushels of turnips; and will go as far in support of stock. The great difference in the two crops is to be found in the farmer's barn yard. Here is the test of their comparative value. This is the secret of the great advantages, which follow from their cultivation. The value of manure in agriculture is well appreciated. M'Queen states the extraordinary fact, that the value of the animal manure annually applied to the crops in England, at current prices, surpasses in value the whole amount of its foreign commerce.* There is no

* This is a very extraordinary fact, but it rests upon good authority; and when it is considered that this is of course the product of agriculture, as well as going in the great circle, to renew and extend these products, we must have strong impressions of the amazing extent of this great interest. In this case, cattle ma-

doubt that it greatly exceeds it. The turnip crop returns a vast amount of nutritive matter to the soil. The farmer, then, from his green crops, and by a regular system of rotation, finds green feed for his cattle and wheat for the market.

Among the lighter English soils, is that of the county of Norfolk; a county, however, which he had not the pleasure to visit. Its soil, he understood, is light, a little inclined to sand, or light loam. Such soils are not unfavorable to roots. Here is the place of the remarkable cultivation and distinguished improvements of that eminent cultivator, Mr. Coke, now Earl of Leicester.* In these lands, he understood, a common rotation is turnips, barley, clover, wheat. These lands resemble much of the land in our county of Plymouth; and the sandy lands to be found in the vicinity of the Connecticut and Merrimack rivers. The cultivation of green crops in New England deserves attention. There is no incapacity in our soil; and there are no circumstances unfavorable to their production. What would be the best kind of succulent vegetables to be cultivated, whether turnips, or carrots, he was not prepared to say. But no attempts within his knowledge had been made among us of a systematic agriculture; and until we enter upon some regular rotation of crops, and our husbandry becomes more systematic, no distinguished success can be looked for. As to our soil, as had been remarked, there is no inherent incapacity for the production of any of the common crops. We could raise wheat in Massachusetts. The average crop in England is twenty-six bushels to the acre. From his own farm, and it was comparatively a thin and poor soil, he had obtained this summer seventy-six bushels of wheat upon three acres of land. It is not, therefore, any want of capability in the soil; but the improvement and success of our husbandry must depend upon a succession of crops adapted to the circumstances of our soil, climate and peculiar condition.

In England, a large portion of the turnip crop is consumed on the land where it grows. The sheep are fed out of doors all winter; and he saw many large flocks, thousands and millions of sheep, which were never housed. This was matter of surprise, especially considering the wetness of the climate; and these sheep were often exposed in fields where a dry spot could not be found for them to lie down upon. Sheep were often folded in England by wattle fences or hurdles temporarily erected in different parts, of the field, and removed from place to place as the portions of the crop were consumed. In some cases they were folded and the turnips dug and carried to them. In such case they were always fed upon lands which were intended the next year to be, as far as practicable, brought under cultivation. He had seen many laborers in fields, employed in drawing the turnips, splitting

them and scattering them over the land, for the use of the sheep, which was considered better, often, than to leave the sheep to dig for themselves. These laborers would be so employed all winter, and if the ground should become frozen, the turnips are taken up with a bar. Together with the turnips, it is thought important that sheep should have a small quantity of other food. Chopped hay, sometimes a little oil cake, or oats, is usually given. This is called *trough* food, as it is eaten in troughs, standing about in the field. In so moist a climate as that of England some land is so wet, that, in the farmers' phrase, it will not *carry sheep*; that is, it is quite too wet for sheep to lie upon it. In such cases the turnips must be *carried*, that is, removed from the field, and fed out elsewhere. The last season was uncommonly wet, and for that reason, perhaps, he could not so well judge, but it appeared to him it would be an improvement in English husbandry to furnish for sheep, oftener than is done, not only a tolerably dry ground to lie on, but some sort of shelter against the cold rains of winter (a.) The turnips, doubtless, are more completely consumed, when dug, split, and fed out. The Swedish turnip, he had little doubt, was best suited to cold climates. It was scarcely injured by being frozen in the ground in the winter, as it would thaw again, and be still good in spring. In Scotland, in the Lothians, where cultivation is equal to that in any part of England, it is more the practice than farther south, to house turnips, or draw them, and cover them from frost (b.) He had been greatly pleased with Scotch farming, and as the climate and soil of Scotland more resembled the soil and climate of Massachusetts, than those of England did, he hoped the farmers of Massachusetts would acquaint themselves, as well as they could, with Scotch husbandry. He had had the pleasure of passing some time in Scotland, with persons engaged in these pursuits, and acknowledged himself much instructed by what he learned from them, and saw in their company. The great extent of the use of turnips, and other green crops, in Scotland, is evidence that such crops cannot be altogether unsuited to Massachusetts.

Mr. Webster proceeded to state, that one of the things which now attracted much attention among agriculturists in England, was the subject of tile draining. This most efficient and successful mode of draining is getting into very extensive use. Much of the soil of England, as he had already stated, rested on a clayey and retentive sub-soil. Excessive wetness is prejudicial and destructive to the crops. Marginal drains, or drains on the outside of the fields, do not produce the desired results. These tile drains have effected most important improvements. The tile itself is made of clay, baked like bricks; about one foot in length, four inches in width, three fourths of an inch in thickness, and stands from six to eight inches in height, being hemispherical, or like the half of a cylinder, with its sides elongated. It resembles the Dutch tiles sometimes seen on the roofs of the old houses in Albany and New York. A ditch is sunk eighteen or twenty inches in depth, and these drains are multiplied, over a field, sometimes at a distance of only seven yards apart (c.) The ditch, or drain, being dug, these tiles are laid down, with the hollow side at bottom, on the smooth clay, or any other firm subsoil, the sides placed near to each other, some little straw thrown over the joints to

nure is valued at 4s. sterling; sheep at 3s.; horse at 4s.; pigs, poultry, &c. at 3s. per load; size of load not given; making a grand total of £59,860,000 sterling, or nearly 300,000,000 dollars. This is understood to be "exclusive of quantity dropped by cattle on land during summer, autumn, &c., perhaps one third more; and exclusive of lime, moss, shells, fish, bone dust, &c."—*Mr. Queen's British Statistics*, p. 61.

* He has increased the rental of his farms by his improvements, from twenty-five to two hundred thousand dollars a year.

H. C.

prevent the admission of dirt, and the whole covered up. This is not so expensive a mode of draining as might be supposed. The ditch, or drain, need only be narrow, and tiles are of much cheaper transportation than stone would be. But the result is so important, as well to justify the expense. It is estimated that this thorough draining adds often twenty per cent. to the production of the wheat crop. A beautiful example came under his observation in Nottinghamshire, not long before he left England. A gentleman was showing him his grounds for next year's crop of wheat. On one side of the lane, where the land had been drained, the wheat was already up, and growing luxuriantly; on the other, where the land was subject to no other disadvantage, than that it had not been drained, it was still too wet to be sowed at all. It may be thought singular enough, but it was doubtless true, that on stiff clayey lands, thorough draining is as useful in dry, hot summers, as in cold and wet summers; for such land, if a wet winter or spring be suddenly followed by hot and dry weather, is apt to become hard and baked, so that the roots of plants cannot enter it. Thorough draining, by giving an opportunity to the water on the surface to be constantly escaping, corrects this evil. Draining can never be needed to so great an extent in Massachusetts, as in England and Scotland, from the different nature of the soil; but we have yet quantities of low meadow lands, producing wild, harsh, sour grasses, or producing nothing, which, there is little doubt, might be rendered most profitable hay fields, by being well drained (*d.*) When we understand better the importance of concentrating labor, instead of scattering it; when we shall come to estimate, duly, the superior profit of "a little farm well tilled," over a great farm, half cultivated and half manured, overrun with weeds, and scourged with exhausting crops, we shall then fill our barns, and double the winter feed for our cattle and sheep by the products of these waste meadows.

There was in England, another mode of improvement, most important, instances of which he had seen, and one of which he regarded as the most beautiful agricultural improvement, which had ever come within his observation. He meant irrigation, or the making of what is called water meadows. He had first seen them in Wiltshire, and was much struck with them, not having before understood, from reading or conversation, exactly what they were. But he had afterwards an opportunity of examining a most signal and successful example of this mode of improvement on the estates of the Duke of Portland, in the north of England, on the borders of Sherwood forest. Indeed, it was part of the old forest. Sherwood forest, at least in its present state, is not like the pine forests of Maine, the heavy hard wood forests of the unredeemed lands of New Hampshire and Vermont, or the still heavier timbered lands of the West. It embraces a large extent of country, with various soils, some of them thin and light, with beautiful and venerable oaks, of unknown age, much open ground between them and underneath their widespread branches, and this covered with heather, lichens and fern. As a scene to the eye, and to the memory by its long existence, and its associations, it is beautiful and interesting. But in many parts, the soil is far enough from being rich. Upon the borders of this forest, are the

water meadows of which he was speaking. A little river ran through the forest in this part, at the bottom of a valley, with sides moderately sloping, and of considerable extent, between the river at the bottom and the common level of the surrounding country above. This little river, before reaching the place, ran through a small town, and gathered, doubtless, some refuse matter in its course. From this river the water was taken, at the upper end of the valley, conducted along the edge, or bank, in a canal or carrier, and from this carrier, at proper times, suffered to flow out, very gently, spreading over and irrigating the whole surface, trickling and shining when he saw it, (and it was then November,) among the light green of the new-springing grass, and collected below in another canal, from which it was again let out, to flow in like manner over land lying still further down towards the bottom of the valley. Ten years ago, this land, for production, was worth little or nothing. He was told that some of it had been let for no more than a shilling an acre. It has not been manured, and yet is now most extensively productive. It is not flooded; the water does not stand upon it; it flows gently over it, and is applied several times in a year, to each part, say in March, May, July and October. In November, when he saw it, the farmers were taking off the third crop of hay cut this season, and that crop was certainly not less than two tons to the acre. This last crop was mostly used as green food for cattle. When he spoke of the quantity of tons, he meant tons of dry hay. After this crop was off, sheep were to be put on it, to have lambs at Christmas, so as to come into market in March, a time of year when they command a high price. Upon taking off the sheep in March, the land would be watered, the process of watering lasting two or three days, or perhaps eight or ten days, according to circumstances, and repeated after the taking off of each successive crop. Although this water has no doubt considerable sediment in it, yet the general fact shows how important water is to the growth of plants, and how far even it may supply the place of other sources of sustenance. Now, we in Massachusetts, have a more uneven surface, more valleys with sloping sides, by many times more streams, and such a climate that our farms suffer much oftener from drought than farms in England. May we not learn something useful, therefore, from the examples of irrigation in that country (*e.*)

With respect to implements of husbandry, Mr. Webster was of opinion that the English, on the whole, had no advantage over us. Their wagons and carts were no better, their ploughs, he thought, were not better any where, and in some counties far inferior, because unnecessarily heavy. The snb-soil plough, for which we have little use, was esteemed a useful invention, and the mole plough, which he had seen in operation, and the use of which was to make an under-ground drain, without disturbing the surface, was an ingenious contrivance, likely to be useful in clay soils, free from stone and gravel, but which could be little used in Massachusetts. In general, he thought the English utensils of husbandry were unnecessarily cumbersome and heavy. The ploughs, especially, required a great strength of draught. But as drill husbandry was extensively practised in England, and very little with us, the various implements,

or machines, for drill sowing, in that country, quite surpass all we have. He did not remember to have seen the horse-rake used in England, although he had seen in operation implements for spreading hay, from the swarth, to dry, or rather, perhaps, for turning it, drawn by horses.

There were other matters connected with English agriculture, upon which he might say a word or two. Crops were cultivated in England of which we knew little. The common English field bean, a small brown bean, growing not on a clinging vine, like some varieties of the taller bean, ran in what is called with us the bush form, like our common white bean, upon a slight, upright stalk, two or two and a half feet high, and producing from twenty to forty bushels to the acre. It is valuable, as food for animals, especially for horses. This bean does not grow well, in thin soils, or what is called a hot bottom (*f.*) A strong, stiff, clayey land, well manured, suits it best. Vetches, or tares, a sort of pea, were very much cultivated in England, although almost unknown here, and is there either eaten green, by sheep, on the land, or cut and carried for green food (*g.*)

The raising of sheep, in England, is an immense interest. England probably clips fifty millions of fleeces this year, lambs under a year old not being shorn. The average yield may be six or seven pounds to a fleece (*h.*) There are two principal classes of sheep in England, the long woolled, and the short woolled. Among these are many varieties, but this is the general division, or classification. The Leicester, and the South Down, belong respectively, to these several families. The common clip of the former may be estimated from seven to eight pounds; and of the last from three to three and a half or four. Mr. Webster mentioned these particulars only as estimates; and much more accurate information might doubtless be obtained from many writers. In New England, we were just beginning to estimate rightly the importance of raising sheep. England had seen it much earlier, and was pursuing it with far more zeal and perseverance. Our climate, as already observed, differs from that of England; but the great inquiry applicable in equal force to both countries is, how can we manage our land in order to produce the largest crops, while at the same time we keep up the condition of the land and place it if possible in a course of gradual improvement? The success of farming must depend in a considerable degree upon the animals produced and supported on the farm. The farmer may calculate in respect to animals upon two grounds of profit; the natural growth of the animal, and the weight obtained by fattening. The skilful farmer, therefore, expects where he gains one pound in the fattening of his animal, to gain an equal amount in the growth. The early maturity of stock is consequently a point of much importance.

Oxen are rarely reared in England for the yoke. In Devonshire in Cornwall, ox teams are employed; but in travelling one thousand miles in England, Mr. Webster saw only one ox team, and here they were driven one before the other, and in harnesses similar to the harnesses of horses. Bullocks are raised for the market. It is highly desirable, therefore, both in respect to neat cattle and sheep, that their growth should be rapid and their fattening properties favorable, that they may be early disposed of, and consequently the expense of production lessened.

Is it practicable on the soil and in the climate of Massachusetts to pursue a succession of crops? He could not question it; and he had entire confidence in the improvements to our husbandry and the great advantages which would accrue from judicious rotation of products. The capacities of the soil of Massachusetts were undoubted. One hundred bushels of corn to an acre had been repeatedly produced, and other crops in like abundance. But this would not effect the proper ends of a judicious and profitable agriculture, unless we could so manage our husbandry that by a judicious and proper succession of crops, the land would not only be restored after an exhausting crop, but gradually enriched by cultivation. It is of the highest importance that our farmers should increase their power of sustaining live stock, that they may therefrom obtain the means of improving their farms.

The breed of cattle in England was greatly improved, and still improving. He had seen some of the best stocks, and many individual animals from others, and thought them admirable. The short horned cattle, brought to this country, were often very good specimens. He said that he had seen the flocks from which some of them had been selected, and they were certainly among the best in England. But in every selection of stock, we are to regard our own climate, and our own circumstances. We raise oxen for work, as well as for beef; and he was of opinion that the Devonshire stock furnished excellent animals for our use. We had suffered that old stock, brought hither by our ancestors, to run down, and be deteriorated. It had been kept up, and greatly improved, in England, and we might now usefully import from it. The Devonshire ox is a hardy animal, of size and make suited to the plough, and though certainly not the largest for beef, yet generally very well fattened. He thought quite well, also, of the Ayrshire cows. They were good milkers, and being a hardy race, on that account, well suited to the cold climate, and to the coarse and sometimes scanty pasturage of New England. After all, he thought, there could be no doubt, that the improved breed of short horns were the finest cattle in the world, and should be preferred, wherever plenty of good feed, and some mildness of climate invited them. They were well fitted to the Western States, where there is an overflowing abundance, both of winter and summer feed, and where, as in England, bullocks are raised for beef only. He had no doubt, also, that they might be usefully raised in the rich valleys of the Connecticut, and perhaps in some other favored parts of the state. But, for himself, as a farmer on the thin lands of Plymouth county, and on the bleak shores of the sea, he did not feel that he could give, to animals of this breed, that entertainment, which their merit deserved.

As to sheep, the Leicester were like the short horned cattle. They must be kept well; they should always be fat; and, pressed by good keeping, to early maturity, they are found very profitable. "Feed well," was the maxim of the great Roman farmer, Cato; and that short sentence comprises much of all that belongs to the profitable economy of live stock. The South Downs are a good breed, both for wool and mutton. They crop the grass that grows on the thin soils, over beds of chalk, in Wiltshire, Hampshire, and Dor-

setshire. They ought not to scorn the pastures of New England.

When one looks, said Mr. Webster, to the condition of England, he must see of what immense importance is every, even the smallest degree of improvement in its agricultural productions. Suppose that by some new discovery, or some improved mode of culture, only one per cent. could be added to the annual results of English cultivation; this, of itself, would materially affect the comfortable subsistence of millions of human beings. It was often said that England was a garden. This was a strong metaphor. There was poor land, and some poor cultivation in England. All people are not equally industrious, careful. But on the whole, England was a prodigy of agricultural wealth. Flanders might possibly surpass it. He had not seen Flanders; but England quite surpassed, in this respect, whatever he had seen. In associations for the improvement of agriculture, we had been earlier than England. But associations now exist. He had the pleasure of attending the first meeting of the National Agricultural Society, and he had found it a very pleasant and interesting occasion. Persons of the highest distinction for rank, talents and wealth, were present, all zealously engaged in efforts for the promotion of the agricultural interests. No man in England was so high as to be independent of the success of this great interest; no man so low, as not to be affected by its prosperity, or its decline. The same is true, eminently and emphatically true, with us. Agriculture feeds us; to a great degree it clothes us; without it, we could not have manufactures, and we should not have commerce. These all stand together, but they stand together like pillars in a cluster, the largest in the centre, and that largest is agriculture. Let us remember, too, that we live in a country of small farms, and free-hold tenements; a country, in which men cultivate with their own hands, their own fee-simple acres; drawing not only their subsistence, but also their spirit of independence, and manly freedom from the ground they plough. They are at once its owners, its cultivators, and its defenders. And whatever else may be under-valued, or overlooked, let us never forget, that the cultivation of the earth is the most important labor of man. Man may be civilized, in some degree, with great progress in manufactures, and with little commerce with his distant neighbors. But without the cultivation of the earth, he is, in all countries, a savage. Until he steps from the chase, and fixes himself in some place, and seeks a living from the earth, he is a roaming barbarian. When tillage begins other arts follow. The farmers, therefore, are the founders of human civilization.

APPENDIX.

Note (a.)—Housing Sheep.

If sheep were allowed to give their voice on the subject, there is little doubt how the question would be decided. Where a shed is open at one side, sheep in case of a cold storm of rain or sleet, will always, if left to govern themselves, seek a shelter. Under other circumstances they are equally disposed to remain in the open air.

The very fine woolled sheep, whose constitutions are

tender, require much nursing; and in our climate must be sheltered. This is necessary, also, in order to preserve the fineness of the wool; and some shepherds go so far as to put linen jackets upon them. With respect to the coarse woolled sheep, and the half bloods, many of the best farmers in Vermont and in the western part of Massachusetts, have come to the conclusion that their flocks are, upon the whole, better in health, and that the per centage of loss in their flocks is less, where the flocks are fed at stacks in the field and rarely housed, except occasionally at their own pleasure, than where they are regularly shut up every night in a covered and close fold. Any one, who has been accustomed to the air of a sheep house, where a flock has been confined all night, can hardly doubt that it must be prejudicial to the health of the animals unless their lungs are made of leather.

Our climate differs essentially from that of England; but with us to fold sheep in wet yards is likely to produce the disease of the foot-rot, a most troublesome disorder and extremely difficult to eradicate. If it does not produce the disease, yet if the poison is lurking within the foot, it will bring it out and aggravate it. It is an infectious disorder, and I know from experience, much to be dreaded; though I am not prepared to say with a writer of no small credit, that the only effectual remedy is to cut off the sheep's head.

H. C.

Note (b.)—Turnips.

The common flat or white turnip is little cultivated among us, excepting for the table. The Swedish turnip or ruta бага is much more valued for its solidity, its supposed superior nutritiveness, and its endurance. It may be kept perfectly well until May, and often until June. They are easily grown; but the condition of the land cannot be too much enriched. With respect to the keeping of them through the winter, we protest, on account of the health and comfort of his family, against a farmer's ever putting any of the turnip or cabbage family into his house cellar; but they may be stored in his barn cellar, or a deposit may be made for them on his barn floor if the sides be well filled in and the top carefully covered with hay, for which purpose the poorest will answer. Or I have preserved them in perfection by pitting them in the field where they grew. For this purpose, on the driest part of the field, dig a hole about six inches or a foot in depth, and wide and long according to the quantity of turnips you have to provide for, there deposit your ruta бага after they are dug and trimmed, and raise the pile in a sloping form like the pitched roof of a house. Do this after the dirt has been knocked off the turnips, and they have become as dry as circumstances will admit. Lay on the heap a thin layer of straw, and a thin covering of earth, leaving the south end of the heap, which should be made north and south, to be stopped up with several loose bundles of straw. Then make a few holes with a crow-bar to act as ventilators until the first heat of the turnips is over. Let them remain in this condition until the cold increases, so that they are in danger of freezing; then put another layer of straw and another covering of dirt, smoothed down neatly with a spade, so that it may shed the rain. Your turnips in this way will keep well all winter, and access to them will be easy through the winter at the south end, by removing the loose bundles of straw, and afterwards carefully replacing them. The straw and dirt, by the aid of frost, will make a perfect roof to your turnip house, which will stand firm until the frost is gone. I have kept hundreds of bushels for my stock in this way; and if a farmer desires in the feeding season to make accurate calculations of the amount consumed as he goes on, he can put them up in heaps of one or two hundred bushels each in different parts of his field, managing with them in the way I have described.

The cultivation of green esculent vegetable crops cannot be too strongly urged upon our farmers. We shall never reach an improved husbandry until we get into a regular system of rotation of crops; and green feed for our winter feeding forms a part of that rotation. Condiments or esculents of this sort are as important for our cattle as potatoes and other vegetables are upon the farmer's table. The condition of our cattle, and especially our young stock and our milking stock, would be greatly improved by them. This green feed can be produced in many cases at a less expense than long feed. It makes, from the exact cultivation required, an excellent preparation for grain; and it supplies under proper management, directly and efficiently the means of enriching our farms, and of increasing their productiveness in a rapid ratio.

H. C.

Note (c.)—Drainage.

According to the testimony of Mr. Kennedy, formerly M. P., and Mr. James Smith of Deanston, England, the author of this system of draining and inventor of the subsoil plough, before a committee of the British Parliament, these drains where tiles are used, are sunk to a depth of twenty-four inches, and where stones are used, are sunk to a depth of thirty inches; the object in each case being to stir the ground in the course of improvement with the subsoil plough, to the depth of sixteen inches, without disturbing the tiles or the drain. When stones are used the ditch is sunk to the depth of thirty inches; small stones are then thrown in promiscuously to a height of twelve inches; and then a sod of two or three inches thick, inverted, is laid over the stones to prevent the dirt falling in and stopping the passage of the water; the top is then filled up and the field left smooth. The centre or main drain into which the cross drains empty, is sunk to the depth of three feet. These drains are durable and effectual. Tiles have not been used among us; but nearly twelve years ago, I made several hundreds of rods of these covered drains with small rough stone, as above described, in order to drain a wet field. The drains continue to operate well to this time. The value of the land was increased ten-fold; and the increased crops soon paid the whole expense of the improvement. These drains are entirely out of sight; but I would advise, whenever they are made, that their distances and direction should be accurately laid down in a plan of the farm, that they may easily be found in case of interruption.

In England, the improvement is not considered as complete, until, after the land is drained, the whole field is by a gradual process, loosened with a subsoil plough to the depth of sixteen inches. The land is first ploughed to the depth of six inches and a crop of oats is taken; it is then ploughed again and subsoiled, if I may use the expression, to the very top of the drain, care being taken not to bring much of the subsoil to the surface at a time, but the top and the lower soil are intermixed by a gradual process of cultivation. Other crops are then taken from this land, which is cultivated and manured in the usual manner; and the products are enormously increased by this process. I shall give more full details in my third Report of the Agriculture of Massachusetts, now in the press.

H. C.

Note (d.)—Redemption of Peat Meadows.

Some most beautiful examples of the success of redeeming lands by draining, especially bog meadow, are to be found in Saugus, Lynn, Lexington, Framingham, Groton, and other towns in this state. In these cases, lands which were of little value, are now brought into most productive fields, yielding five or six hundred bushels of potatoes and three to four tons of hay per acre besides other crops. These, however, are in ge-

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neral open drains. We have a very large amount of peat land in the state, which is capable of being thus redeemed and made some of the most productive in the state. By the estimation of the learned geological surveyor, there are more than 80,000 acres or 125 square miles. One of the most remarkable examples of this sort of improvement may be found detailed in the appendix to the third Report of the Agriculture of Massachusetts. This was made by Mr. Timothy H. Brown, of Saugus, and deserves particular attention. An account of it is given likewise, in the Reports of the Essex Agricultural Society for 1838-9.

There seems to me no reason why the introduction of the Deanston system of improvement, thorough draining and subsoil ploughing, may not be introduced among us in particular localities, to as great advantage as has been done in Scotland.

H. C.

Note (e.)—Irrigation.

A very skilful enterprise of this same kind, on a smaller scale, has been undertaken in Medway, which promises the best results. Here a considerable stream has been dammed and carried in a canal round the whole field of several acres, so as to be allowed to flow upon them over the bank at the pleasure of the owner. Two other examples of irrigation are to be seen, one in the upper part of Dedham, and one in Chelmsford, which, though on a small scale, have been eminently successful. Our improvements are very humble compared with those referred to by Mr. Webster; but they are creditable and encouraging. The struggling steps of infancy must be taken before we can move with the firm gait of manhood. The enriching qualities of water are far from being properly appreciated. In such circumstances as described, it is by no means a simple substance; and it effects an essential purpose in holding in solution the nutriment of the plant with which it mixes in its passage over the soil and percolations into it.

H. C.

Note (f.)—The Bean.

The bean (*vicia faba*).—"The bean is a valuable field plant, as affording food for live stock and in part for man. The varieties of the bean are two, garden and field beans, the white and the gray beans. The best soils for beans, are clay and strong loams. On such soils they generally succeed wheat or oats, but sometimes also clover lays. Turnip soils or sands are by no means proper for them. The climate most favorable to the bean is one neither very dry nor very moist; the first brings on the fly; and the last prevents the setting of the blossoms. The flour of beans is more nutritive than that of oats, as it appears in the fattening of swine." Dr. Darwin thinks them a cheaper provender for horses than that of oats; but being of an oily nature, more difficult of digestion than oats, and he would therefore hesitate in giving them the preference for this object.

The bean is considered as an exhausting crop; but on account of the clean cultivation which is given to it, it often favorably precedes wheat. My own experiments in the cultivation of the English field bean, which I have tried two or three years, resulted in disappointment, as they were in every instance destroyed by a little black fly. This is the great enemy with which they have to contend abroad. Forty bushels to the acre must be regarded as a large yield. From twenty to thirty-five is more common.

The cultivation of the white bean among us, is pursued to a very small extent and in a very slovenly and negligent manner. Land that is under a curse, and considered fit for nothing else, is usually selected for a crop of white beans; and a farmer would as soon think of dressing his children in peacock feathers as of giving any manure to his white beans. The result is exactly what, under such circumstances, is to

be expected. We have no doubt that, under proper cultivation, beans may be made a highly productive and valuable crop. For feeding sheep, especially fattening-wethers, I have tried and know their value. Inter-mixed and ground or alternated with Indian corn, they are exceedingly favorable for the thrift of sheep, and may be to a degree profitably used, notwithstanding the customary difference in price. We can hardly expect, however, that they should take the place of Indian corn; a crop which cannot be grown in England, which is not more exhausting than any other grain crop allowed to perfect its seeds, which when consumed on the farm under good management, returns a large amount to the land; and the rough fodder of which, when well cured, is almost an equivalent for the cost of cultivation. H. C.

Note (g.)—The Tare.

The tare or vetch (*vicia sativa*) is a plant which we have sometimes seen growing, but rarely cultivated among us. There is no hindrance in our climate to its cultivation; and perhaps the great reason why the cultivation of the tare or field bean has been neglected or not introduced, has arisen from our capacity to produce Indian corn; and our high estimation, which can hardly be extravagant, of its value as food for the brute and the human animal. As green feed especially, and for the purposes of soiling, undoubted-ly the tares might be introduced to great advantage.

"The tare," says Low, "is one of the most esteemed of the leguminous plants of this country, (England.) When used as green forage, they are cut after the pods are formed, but long before the seeds are ripe. Being in the class of crops not allowed to mature their seeds, they are not exhausting to the soil. They are considered as restorative crops, from the quantity of manure which the consumption of them affords. They are exceedingly nutritious, and supply a larger quantity of food for a limited period, than almost any other forage crop. All the animals of the farm are fond of this legume, and all thrive upon it in an eminent degree. Hogs may be fattened entirely upon it. It causes milch cows to give more butter than any other species of food, and it is employed extensively in the feeding of horses. All the English agriculturists are impressed with a high opinion of the value of tares."

Young observes, "tare crops are of such use and importance that not one-tenth of the stock could be sustained without them; horses, cows, sheep and hogs are all fattened upon them; hogs are soiled upon them without any other food. This plant maintains more stock than any other plant whatever. Upon one acre, Davis maintained four horses in much better condition than upon five acres of grass. Upon eight acres he has kept twelve horses and five cows for three months without any other food. No artificial food whatever is equal to this excellent plant."

"Tares cut green," Professor Thaer observes, "draw no nourishment from the soil, whatever: while made into hay they afford a fodder preferred by cattle to pea straw, and more nutritious than hay or any other herbage."

These high encomiums on this plant will, we hope, invite the attention of our farmers strongly to the subject, that experiments may be made among ourselves of their adaptation to our climate and soil; and of the expediency of introducing them among a rotation of crops in our system of husbandry, if we are so fortunate presently as to have a system. Tares are of two kinds, winter and spring, but not distinguishable from the appearance of the seed. The winter tares are sowed in England in September and October, and where they are designed for soiling, the sowing is continued at successive times until May. The spring tares are advised to be sowed as early in the spring as they can be got in. A clay soil is most congenial to their growth; and any rich soil will do, provided it is not too dry.

The quantity of seed to an acre is from two and a half to three and a half bushels; the latter quantity where they are to be cut for green fodder; the former where they are cultivated for their seed. It is advised to sow some grain with them, such as rye with winter tares and oats with spring tares, which serve to support them.

It is doubtful whether tares sowed in the fall would survive our severe winters. This, however, can only be determined by some actual experiment. We hope they will have a fair trial. For soiling they must be an excellent article; and I cannot but hope that the practice of soiling will prevail much more among us; especially for the quantity of most valuable manure, which under proper management may be made in this way. I ask leave here to refer to an admirable and encouraging experiment in soiling, on a small scale, in my second Report of the Agriculture of Massachusetts, p. 69. H. C.

Note (h.)—Product of Sheep.

This would seem to be a large yield, but perhaps under good management, not overrated. Mr. Hubbard, an extensive wool dealer at Leeds, whose authority appears to be much relied upon, states the average of the short woolled sheep at 3½ lbs. each, and the long woolled at 7½ lbs. each. McCulloch, in his tables, states the yield of the Teeswater sheep to be 9 lbs. to a fleece; the Lincoln, 10 lbs.; of the Dishley, 8 lbs.; of the Costwold, 9 lbs.; and of the South Downs 2½ lbs.; of the Cheviot, 3 lbs. to a fleece. It is stated in another work that a Mr. Sellar, by dint of persevering attention to the choice of rams, the change of herbage and placing the sheep at different ages upon appropriate pasture, together with supplies of artificial food in the pinching seasons of the year, has raised the average wool of the Cheviot race, to 4 and 4½ lbs. per fleece.

I have known cases of as remarkable improvement here. They show emphatically how much a farmer's success depends on enterprise, care and skill.

I ought to say, in this place, that Mr. Webster is in no respect whatever responsible for the notes attached to his address. With the exception of those on beans and vetches, he has not seen them. H. C.

From the Franklin Farmer.

IMPROVEMENT OF THE SOIL RESULTING FROM THE GRAZING SYSTEM OF KENTUCKY.

Frankfort, April 6, 1840.

In a late number of the Tennessee Farmer, I find a communication, signed "D.," addressed to the editor of that paper, from which the following is an extract:

"In the Franklin Farmer of December 7th, 1839, published at Frankfort, Kentucky, but recently, I believe, transferred to Lexington, there is an editorial article, from which the following is extracted:

"In our calcareous lands, we can manufacture our manure on the very spots where we want it to be spread; but on other soils, it must be made in the barnyard and hauled out, and in the former practice, the improvement of the soil will probably be more apparent than in the latter. It is a fact distinguishing the husbandry of some of our best graziers, that their lands, taken in a partially exhausted state, thirty years ago, have not only improved in production every year, but exhibit now the appearance of virgin fertility."

Now, sir, to improve exhausted land without be-

ing compelled to resort to the tedious and horrible drudgery of hauling out and spreading manure, is truly a grand desideratum to the practical farmer; and it is much to be regretted, that the writer of the above extract did not favor us with the details of a plan, from which such desirable results can be obtained. If you are not yourself acquainted with the system in question, perhaps you can, through the medium of your paper, obtain the requisite information, which no doubt will be thankfully received and put into operation by many of your subscribers."

Being at the date referred to, the editor of the Franklin Farmer and the author of the remarks on manure, quoted by "D." I am disposed to respond to him. But in doing so, I waive exception to the spirit of incredulity which, it appears to me, lurks in his tone. Any one who has ever intelligently observed the operations on the highly improved farms in the calcareous lands of Kentucky, would at once refer my remarks on our manuring, quoted above, to the processes connected with our grazing system; and these would embrace almost the entire agricultural operations on such farms. I cannot pretend, in the limits to which I am necessarily restricted in a weekly paper, to write out all the "details" of the system referred to; for it would require a volume to do them ample justice; but I think I can present the general outlines of the system in a manner to render it intelligible. In speaking of *manuring*, as connected with the grazing system of Kentucky, I use the term in a general sense; signifying, not only the application of putrescent matters to the soil, but all those ameliorating processes, embracing a judicious rotation of crops, including grasses, which serve to produce and maintain an increased state of fertility. I am aware that, in some quarters, our system is sneered at, on the ground that we do not, technically, manure our fields, that is, haul materials for making manure into a barn-yard, and then, after certain processes, haul out the same upon the fields. But as, besides deriving profits from the products of agricultural labor, the great object of cultivation is to improve the fertility of the soil, I cannot see any objection to the employment of the term, *manuring*, for the result of any practices or processes by means of which these two great ends are reached. If, by the agency of different processes, equal results are obtained; the only subject of consideration, in the choice of one or other of those processes, to effect the desired result, would be, that of its comparative convenience, applicability or economy. That an exceeding degree of fertility is produced and maintained and that large profits are realized under the operations of the grazing system, I need only point to the heavy productions of the grazing farms, and to the great prosperity of the graziers, to show. And in speaking of the fertility produced under this system, I mean, literally, that, under its operation, lands taken in what is called a "worm-out" state, are brought up to a state of the highest productive capacity. That the same system, therefore, would preserve, if not increase, the original richness of the virgin soil, is too well established, even if experience were wanting on this particular point, to admit of a doubt. It is to be taken into consideration that this system is of but comparatively recent adoption; that it is not yet fully practised in many sections of our calcareous lands; and that it was commenced in a section where the pre-

vious systems, (or rather, bad practices,) had actually skimmed the land of its richest soil. What of fertility was left in the soil, even of this new and rich land, after years of exhausting cultivation, first, in that horrible scourge of land, tobacco, and next in grain, exported to distant markets or consumed in the infernal distilleries of whisky, may be best told by those who, appalled at the prospect of impoverished fields and purses, fled from out this garden of Eden, to procure, still further west, *fresh* lands. Now let us suppose one of these farms, thus exhausted and deserted, passing into the possession of a farmer whose system of husbandry has two cardinal objects in view — to realize annual profits and at the same time maintain a steady progressive improvement in the fertility of the soil. If he gets possession in the fall, he sows down the exhausted fields in rye or wheat, generally rye, and if in the spring, in oats; and in the winter or spring, seeds with red clover, timothy and blue-grass. When the small grain is ripe enough, he turns his stock upon it, feeds it down upon the ground, and then, taking the stock off, allows the clover and other grasses to come forward. The clover coming forward, if the season be favorable immediately after the small grain is eaten down, shades the ground from the intense heat of the sun, which so injuriously affects naked fallows. The field is next grazed by stock; and the mixture of timothy and blue grass with the clover prevents the latter hoofing the cattle. The second year the field is also grazed, but the stock is taken off long enough to allow the clover, which is a biennial plant, to ripen its seed, which being shed, clothes the field with clover for two more years if it is desired to keep it that long in grass; but a frequent practice is, if the land be not excessively exhausted to turn the clover under and plant in corn the third year; and this may safely be done, with a confident expectation of gathering, in a favorable season at least, 50 or 60 bushels of corn to the acre, if the land had not been reduced previously, to a state of exhaustion producing less than 25 or 30 bushels. If the exhaustion be more excessive, reducing the production to a point lower than I have stated, it is advisable to let the field remain in pasture four years. The third or fifth year as the case may be, the sod is turned over flat by a sod-plough running just through it, or say two or three inches; then following in the same furrow with another plough, commonly a Cary, from four to six inches deep, bury the sod to that depth; some even follow with a third, to lay the sod ten or twelve inches below the surface, where, being out of the way of the after culture, it gradually decomposes, furnishing food to the growing crop, protecting it from the excessive influences of drought, and deepening the tilth. Whether a third ploughing in the same furrow be proper, is to be determined by the depth of the soil and the character of the subsoil. If the subsoil, that is, the earth below the surface soil, containing no mould, or dark, decayed vegetable matter, be a light, friable, yellow, reddish or brown clay, the plough may run down to it, and, indeed, bring up some of it to the surface, where exposure to the influences of frost, sun and atmosphere, renders it into a fertilizing earth incorporated with the vegetable matter turned under; and this process also effects the very desirable object of deepening the soil. But I suspect it would probably be better to defer this deep

ploughing until the end of the second term of rotation. If the state of fertility has been sufficiently improved by the small grain fed down and by the grasses following, of which a tolerable judgment may be formed by the thickness of the covering of sod, it is advisable to plant the field a second year in corn. A sound judgment must determine the propriety of taking two successive crops of corn from the same field. If the previous covering of grass had been very heavy and the sod turned under in the manner recommended, in nine cases out of ten, other circumstances being equal, a heavier crop of corn will be obtained the second than was the first year, owing to the greater quantity of food afforded the second crop by the more perfect decomposition of the vegetable matter turned under. It is a matter of economy to plant the second year in corn, provided it be justified by the circumstances mentioned; for it is a heavy job to break up the sod for only one crop of corn. But on an exhausted farm, it is not recommended to take two successive crops of corn at the end of the first term of rotation, unless the field laid four instead of two years in pasture; but at and after the end of a second period of rotation, the practice may, both safely and economically be followed, with a fair prospect, in favorable seasons, of making from 75 to 100 bushels to the acre.—When the corn has sufficiently matured, it is cut up and shocked, sixteen hills square, or 256 hills forming a shock. The shocks are hauled out in the winter on a field most needing improvement and fed on the ground to the stock. It is spread generally over the feeding field, and of course thickest on the poorest spots. In breaking up in the spring, the cornstalks, together with the droppings of the stock, are turned under the soil, and decomposing there, afford a most valuable manure to the growing crop. Now, Mr. Editor, will not “D.” consent that this is a system which “manufactures our manure on the very spots where we want it to be spread,” and which obviates the “horrible drudgery of hauling out and spreading manure on exhausted fields? It will be seen that this system manures the land at no expense whatever; while other systems are not only very expensive, but “tedious and horrible drudgery.” The only labor devoted to all to manuring in this system is, that of hauling out the corn to the stock and spreading it over the feeding ground; but this labor accomplishes also the important and indispensable duty of feeding the stock; and to say the worst, it is no more, if so much, as is requisite, under other systems, to get the food of animals from the fields where it grew to the barn, whence, after passing through the animals, it is to be thrown, with painful labor, in compost heaps, and then hauled back again to the fields. I do not pretend to doubt, that barn-yard manure, *if especially taken care of and manufactured in compost heaps*, is a more valuable manure spread on the fields than the under vegetable matter which the grazing system gives to the soil. But I do insist that this system not only returns more vegetable matter to the soil than it takes from it, and that it replaces more vegetable food in the fields than any other system with which I am acquainted, through the medium either of observation or books.

It is true that manure manufactured carefully in compost heaps, where its stimulating gases are prevented from escaping, is a more effective vege-

table stimulant than vegetable matters which have remained exposed and uncovered on the ground.—But the only matter of this description which, in the grazing system, is thus exposed to waste or loss of its fertilizing powers, is the corn-stalks fed from the beginning of winter till spring on one of the fields. But let us look a little into the extent of this loss and compare it with that which results from the other system. I am by no means satisfied that there is at all any loss of fertilizing power sustained by spreading the corn-stalks on the exposed surface of a field; for the gases are not evolved till the vegetable matter assumes a putrescent quality, which is rarely the case unless such matter be mixed with dung or other fermenting materials. But how stands the case in the barnyard? Even under the most careful husbandry of the manure of a barn-yard, more of its value must be lost there by the escape of its gases than can possibly occur in the grazing field. The dung of the animals lies on the ground or the barn floor till convenience or necessity requires its removal to the compost heap; and I am sure that this matter is in a far more putrescent and fermentable state than dry corn-stalks can be, and that it loses more of its stimulating power than can by possibility be parted with by the cornstalks. But even granting that the loss in the two cases were equal, the great difference in the quantity of manuring material furnished the fields under the different systems would turn the scale in favor of the grazing system. Under that system, *all* that the earth yields, is returned to it without loss of quantity, and it is equally spread and diffused, and incorporated through the entire soil; under the other system, that which is grown on a field is taken off, and, if returned at all, is carried back diminished in quantity and spread unequally over the surface. I admit that barnyard compost manure is very powerful and valuable; and that it derives much of its efficacy from the animalizing process of passing through horses and cattle; but I wonder that the method of ploughing in sod which I have described, is not seen to be the most perfect plan of forming a compost heap ever invented or practised. In this plan the sod, the material of the manure, is taken in a state when no evaporative processes are wasting, in evolving gases, its most vital qualities, and it is turned under the earth where subsequent fermentation does not give its gases to the winds, but where the soil reaps the entire benefit of the decomposition of all the vegetable matter grown on it. It is true that *gardeners*, in Flanders, England, New England, and elsewhere, profitably make compost heaps from the materials in the barnyard or the stable, aided by other materials carried there, for the purpose of manuring small parcels of ground. I do this myself: and I would not be deprived of the pleasure, as well as profit, of so treating my garden, for four times the whole value of all its produce. But this is a system only suited to very small farms compared to those of this country. Here land is cheap, and plants and labor scarce and dear; but land is high and labor abundant and cheap, where these laborious plans of manuring are profitably conducted. Under our system, ten men is a force sufficient to cultivate profitably two thousand acres of land, and the products and fertility of the farm will annually increase. But I am dilating too widely on this branch of the subject.

As soon as the corn is shocked, the field is prepared for rye, which is immediately sown and harrowed in. Some, however, in the hope of getting more forward winter and spring pasture, and to let the rye get well rooted before frost heaves the ground, sow while the corn is yet standing and plough in; but by this process, the ridges, formed in cultivating the corn crop, remain unleveled, which, to say the least, is no agreeable sight to the eye of a neat husbandman. The clover, from the seed sown the second year, will come up spontaneously after the rye has been fed down; but the grazier will judge of the propriety and economy of sowing other grass-seed, to come forward with it. And so go round and round again and again with the same system of rotation; and if this system of husbandry does not yield large profits and at the same time improve the soil every year, I will never again deny the patriotism and good judgment of those native Kentuckians who remove to the west for *fresh* lands, or even of those who go to the south to establish cotton farms.

But there is another branch of the grazing system yet to be noticed. The successor to exhausted fields, will most generally have to set the woodlands, attached to the farm, in blue grass; for few of those who go to "the new country" for *fresh* lands, were provident enough in this *old* state, to clean up their woods and make pastures. Their stock generally subsisted "in the range." Their lean, bony, angular pointed cows were browsing the bushes with horribly toned bells depending by a strap around their necks; their sheep were at large too, headed by a "bell wether;" their hogs, if ever you could come up to them in the woods, while seeking "*mast*," on discovering you, would utter their peculiar "*hugh!*" and off would go like frightened deer; and ten to one, but you would see some "*bag of bones*," somewhat in the shape of an old mare, tinkling too her drowsy bell, at the head of three or four ragged "*young things*," commonly called colts and yearlings, biting off the buds of the undergrowth. And did you never observe, Mr. Editor, that this class of—not good farmers, for I can't call them so, but—vexers of a kind soil, are the very men who rail out so against our paying a little extra to get superior breeds of stock? But there are few, if any of this class, remaining in the improved districts. Some are reposing beneath the clouds which they vex no more; many more have taken large bodies of land and the fever and ague in the west, and the few who are still left, have *partially* set their lands in grass, *because the new-fangled notions of farming have destroyed all the range!*

But I am off the track again. The preparation necessary for covering woodland with a close turf of blue grass is, to cut out all the undergrowth and trees of every kind, not wanted for fencing, fuel or other economical uses. The leaves are raked up and burnt with the useless wood, and then, in the latter end of winter or very early in spring, the land is seeded with blue grass. It is a very delicate plant when it first springs, and should not be grazed for a year, unless very vigorous, and not then till the seeds have matured. We thus have a most luxuriant coat of blue grass and it is there for ever without further trouble. There is no attention necessary to its preservation other than the exercise of prudent care against overstocking it and against turning on it early in the spring before it gets a

good start. I do not know any country on the globe in which, in an agricultural point of view, the woodlands are so valuable as in Kentucky, and certainly no rural sight can be so lovely as that of a woodland blue grass pasture, where all the unsightly and useless trees are removed and the soil is coated with a fine close turf. It is true that woodland grass is not equal, in nutritious quality, to that growing in open fields; but still it is a powerful auxiliary to the resources of the grazier. I have known woodland grass rented for three to five dollars an acre from May to December, and this is more net profit than was probably realized from cleared land by many of those whose system impoverished themselves and their fields. But let the intrinsic value of woodland grass be more or less, it is so much *clear gain* over any other system of husbandry.

Nor is it the only valuable quality of blue grass that it grows more luxuriantly in woodland than any other grass. Its superiority, as a rich and permanent grazing grass in the open fields, is equally manifest, though the value of other grass is highly appreciated. Clover, though very luxuriant, is valuable as a grazing grass, but, comparatively, a short time. Salted, it makes, with careful attention in harvesting, and if not injured by rains while cutting, a good hay; but probably its greatest value lies in its effect of improving the soil by means of its wonderful system of foliage, stem and root.—Timothy is both valuable as a grazing grass, and the best of our hay grasses. Cattle are very fond of it when young and tender, but do not relish it after. Herds grass or red top is the best for low, moist or wet land, but there is little of this description of land in the calcareous districts. It makes a beautiful hay; but, I believe, like timothy, is not a good grazing grass when a little old. Orchard grass is very early in its appearance in the spring—grows more rapidly than any other grass, and of course recovers sooner after grazing. But a serious objection to it is, that it grows in tussocks, that is, detached bunches, and the intervals are never well filled up with any perennial grass so as to form a close covering, like blue grass, of the entire soil. It is a very valuable grass, like timothy, mixed with clover to prevent hoove. Blue grass, though not quite so forward in the spring as other grasses, is on the whole, according to the judgment of most of the graziers, far the most valuable for grazing. It is luxuriant, nutritious and durable; it is a perennial, and will ultimately root out every other grass, even the native white clover; it grows more and more nutritious with advancing age; and no other can come in comparison with it as winter grass. It not only grows in the warm spells of winter, but if the second growth of summer be reserved for winter grazing, it is a most excellent and grateful pasture to animals throughout the whole of that drear period. An old patriarch grazier told me, a year ago, that he had a number of brood mares, ten or twelve years old, that had never eaten a mouthful of grain in their lives; subsisting wholly upon blue grass, except when the ground was covered by deep snow, when hay was given them, and he thought even this was not absolutely necessary. His mares were large, and always fat. Another distinguished grazier, owning some 2,500 acres, told me, a few weeks ago, that he intended, when he grew old and the labor of superintending his farm became burdensome, to culti-

vate] no other crop than blue grass, except barely enough grain to feed his family and work horses. He had no doubt he could raise large fat beeves on blue grass.

In maintaining that the grazing system is a most admirable one, both in view of large annual profits and improvement of the soil, while it is exactly suited to our peculiar circumstances, in reference to climate, markets, and particularly the character and amount of our labor, yet there is one tendency in it, which as a political economist, I cannot but deplore, and that is to enlarge exorbitantly the size of farms, and decrease the number of the tenantry. It certainly thins population, while its operations provide the means of sustaining an increased population. A grazier of good judgment and active energy is sure to buy out all his surrounding neighbors who do not practise the same system of husbandry. Even the stiff, full handed hemp raisers have been known to yield their lands to the graziers. Small farms, cultivated by industrious and intelligent owners, certainly would contribute more to the prosperity and strength of the state. But why need we indulge speculations on this subject. The pride of acres, the thirst of accumulation, the desire of extended possession, are passions of the human breast, which no *postulate* in political economy can curb or restrain; and it is more than idle to speculate upon evils which we cannot remedy. I do not ever fear oppression, in this country, from the over-riding power of a landed aristocracy. Laws of primogeniture and entail can never harm us here; and though a few strong-minded, industrious, energetic farmers do accumulate possessions, almost equal to dukedoms in other countries, the division of their lands among their heirs, soon cuts them up again into small farms of convenient and manageable size. But I am prone to wonder and enlarge, and have already extended this communication to too great length.

I presume "D." will not expect me to explain particularly why the manuring of the grazing system is so peculiarly effective in "our *calcareous* soils." He is, no doubt, apprised that of all descriptions of soil, the calcareous are the most productive; and especially the best adapted to the growth of the grazing grasses. Rich silicious soils produce heavy crops, both of corn and grass, but they are still better adapted, if they have only a very small portion of calcareous matter, to the growth of wheat, barley, oats, and especially, roots. But they can never come into competition with calcareous soils as grazing lands.

It would be extremely useful, Mr. Editor, not only to "many subscribers" in Tennessee, but in Kentucky and other states, if you would procure from a number of our successful graziers, essays embracing the details of the grazing system.—They would embrace too much labor for any one writer, other than a professional author; and I hope the calls from their brethren in Tennessee and elsewhere, will induce them to come out in your paper and state their practices. Let one state his method of setting woodland and open fields in grass—another his mode and time of grazing, stating the value of the various grasses—another his winter treatment, the quantity of fodder given his young stock and the amount of corn fed to the old—and so on, till all the details are fully stated. In proposing this, however, no one should be restricted writing as fully as he chooses on various

branches of details; for though some excel in particular branches, one in making grass, another in producing corn, a third in the economy of feeding, a fourth in his judgment in breeding, and so on, yet many unite eminent knowledge and judgment on various branches of the great subject. Why are not the pens of the Cunninghams, the Humes, the Clays, the Warfields, the Martins, the Boggs, the Suttons, the Dedmans, the Shelbys, and the hundreds of others, whom you and I might name, busy writing for the instruction of those who are imploring information on the various branches of agriculture in which they have respectively distinguished themselves? I wish I could infuse into them some of the spirit which I know stimulates your efforts and mine, and those of a small, but noble band of brethren on this great and glorious subject—the improvement of agriculture.

In concluding this long and desultory letter, dashed off, I assure you, with great haste, under pressure of various employments, I beg leave, while offering my respects to "D." to express the hope that the general outline of our improving system is rendered intelligible to him and his neighbors; and I shall rejoice to hear that he is so impressed with its advantages, as to come and witness it, and study it, and then put it in operation in Tennessee, and thus induce his neighbors to follow his example; for I have long believed and often said, that the grazing business would enrich the pockets and the fields of that noble state faster than tobacco or cotton. Very truly, yours,

THO. B. STEVENSON.

THE TIMES [IN SOUTH CAROLINA.]

From the Carolina Planter.

The financial affairs of the country, public and private, are in a "mixed up state." The currency is as various as the advocates of all kinds can desire. Specie, government post notes, paper of suspended banks, shimplasters, and script, inconvertible paper medium, bearing interest—all are afloat, and all passing current.

The agricultural affairs of the country are in a "desperate" state. Last year more cotton was made than has ever been before in one season—prices are flat—and what is the consequence? more cotton is planted this year to make up in quantity the fall in price—and it will fall lower, if the season continues, as it has begun, favorable. The corn crops are likely to be destroyed by chinch bugs.

In some parts of our state great sickness is prevailing among negroes. Bilious and typhoid pneumonia, diarrhea and dysentery have been frequent lately. Horses throughout the whole southern country are diseased—and dying from the epidemic catarrh. Cattle are in worse condition this spring than for several seasons, and are dying of *hollow horn*—owing to scanty subsistence during the winter, which followed so dry a summer as the last—hogs generally have the mange—cut worms are destroying our gardens—curculios and other insects have attacked our fruit and trees. With all our internal commotions, there are rumors of war—and some of our members of congress are so keen to begin that they have actually "come to the scratch" in the very halls of legisla-

tion—and we the sovereign people are paying thousands per diem to inquire into the facts of a case, which is a stain upon our national council. O tempora, O mores!

FORCE OF INSTINCT.

Mr. Southey, in his History of Brazil, thus describes the perilous situation of Cabeza de Vaca, who, sailing towards Brazil, is preserved from shipwreck by a grillo or ground cricket:—"When they had crossed the line, the state of the water was inquired into; and it was found that of a hundred casks there remained but three to supply four hundred men and thirty horses: upon this the Adelantado gave orders to make the nearest land. Three days they stood towards it. A soldier who set out in ill health, had brought a grillo, or ground cricket, with him from Cadiz, thinking to be amused by the insect's voice; but it had been silent the whole way, to his no little disappointment. Now on the fourth morning the grillo began to ring its shrill rattle, scenting, as was immediately supposed, the land. Such was the miserable watch which had been kept, that upon looking out at this warning, they perceived high rocks within bow-shot: against which, had it not been for the insect, they must inevitably have been lost. They had just time to drop anchor. From hence they coasted along, the grillo singing every night as if it had been on shore, till they reached the islands of S. Catalina."

SQUASHES.

From the Maine Cultivator.

If you would raise squashes for winter use, mark out on the surface of the land six or eight spots for hills, eight feet apart each way. Then take a spade or shovel and dig out a circle, say three feet in diameter, throwing the earth out six inches deep.—Into each hole empty a wheelbarrow load of old rotten manure, mixed with ashes,—and if there is a little lime in it, so much the better. On to this draw the loose earth back which you throwed out of the hole. Now take your spade and dig and mix the soil and earth well together, taking care to pulverize the whole mass faithfully. Level the top off and sprinkle half an inch of rich loam over the top. Drop a dozen seeds on the hill, and press them an inch beneath the surface with the finger. With a hoe smooth and press the top down. If you have a box fitted to receive two or four panes of glass, put this on the hill—or rather if you have such a thing, place it on the hill before you plant the seeds, and drop them all within the frame. Ultimately leave not more than two plants in the hill to stand. You will find that these will, in due time, run out and cover the land all over, and produce you more, larger and better fruit, than if you had the hills nearer together, or allowed a greater number of plants in the hill. It is well, however, to plant enough in the first instance, as a contribution to worms and bugs. If you save two healthy plants out of the dozen that came up, you will do well, and these will be enough. The roots of squashes, under ground, will extend as far and

occupy as much space, where the soil is free and loose, as the vines will cover above ground.

DIFFERENT SOILS.

From the New Genesee Farmer.

Last month we spoke of the importance of a *fine soil*, of *shade*, and of a regular supply of *moisture* for delicate seeds; but another view of the subject may be taken. Among the myriads of plants that embellish our globe, varying in form, in substance, and in color, great constitutional differences exist. Some, like the sea-weed, only vegetate in brine; others, like the wild rice of the west, flourish most in fresh water.—The truffle always remains under ground, while the mistletoe only germinates aloft on trees, and seems to feed on air.

But between the thousands that spread their roots through the earth, and their leaves to the light, depending on timely showers for their nourishment, great differences exist in regard to *soil*. The yellow bloom of the *hypoxis*, is only seen on close *clays*; the perennial *lupin* confines itself to beds of *sand*; and the locality of the *talinum* in Pennsylvania is on naked *magnesian* rocks. *Lime* is essential to the chief objects of the farmer's culture; and a species of *veronica* from its attachment to this mineral, is called in Virginia, the "marl indicator."

Besides the *mineral* constituents, however, there are *vegetable* principles derived from the decay of particular plants, which become a part of the soil, and give it a peculiar character. We may separate the *sand* from the *clay*, and both from the *lime* and *magnesia* or iron—weigh the vegetable matter, and then attempt to make a similar soil of new material in the proper proportion; but unless we have the recrements of similar plants, it cannot successfully be done.—We have seen no artificial soil that would suit the rose-flowering locust; and the heaths only grow in peaty earth, or something analogous. The decaying leaves of the sour pine, so pernicious to the cereal grasses, is a rich manure for the red sorrel.

Among the great numbers of ornamental plants which are collected from so many points of the earth's surface, it is not reasonable to expect that land of the same quality can accommodate them in the best manner. Some will flourish in their new abode; others will vegetate for a time, while a third class will speedily dwindle and perish. Various soils, therefore, differing in both their *mineral* and *vegetable* composition, are necessary in extensive gardens. Small spots of two or three feet diameter, in many cases will be sufficient. Some *annual* flowers will doubtless require them as well as shrubs and herbaceous perennials; and the greater the variety of soils, the greater will be the chance of success. On a small bed of sand, carried more than twenty miles, we have *pinus rigida* and *magnolia glauca*, growing in luxuriance; though every attempt to cultivate them in our common soil had failed. Many beautiful plants require peat from the marshes; and a small cask of the right soil would impart health and vigor to the kalmias and rhododendrons.

BLUE MARL AND GREEN SAND.

To the Editor of the Farmers' Register.

Stafford county, Va., May 20, 1840.

In a communication from a Maryland correspondent, (*Farmers' Register*, Vol. vii, p. 105,) I find the following statement:

"In communications heretofore made to the Register, I have suggested that *blue* marl contains properties fertilizing beyond the lime contained in it. Farther observation has confirmed the opinion," &c. On the farm of the Potomac Silk Company there are very extensive deposits of *blue* marl, which I have been using on a small scale for nearly four years. In some of these banks there is an abundance of decomposed shells, but in others no shells appear, but apparently are made up entirely of the *blue sand*, or rather clay, (for there is no sand in it.) Now the action of both of these marls is precisely similar, as is proved from the following experiments:

In 1837 I manured beets in the drill with the marl having shells, and also in adjacent rows with the *green sand* or the marl without shells. There was manifest improvement in the growth of the beets, compared with some in similar soil, not marled, but the effects of both of these marls were identical. Before applying the marl the soil was thickly set with sorrel, but that has subsequently

disappeared as far as the marl and *green sand* extended.

Both the *shell marl* and the *green sand* have been applied to poor soils, on the surface, and the land left for eighteen months without cultivation; and in every instance, even on broom straw soils, a growth of *white clover* follows. So striking is this effect that the carts may be tracked for nearly a half mile by the growth of the *white clover*.

I have but little experience in agricultural pursuits, but I am disposed to communicate freely the results of my experiments; and I now ask the favor of you, or any of your correspondents, to answer the following question:

Does a top-dressing of lime, without cultivating the land, invariably produce a growth of *white clover*?

I have applied marl to twelve acres, using from 350 to 400 bushels to the acre.

LAYTON Y. ATKINS.

P. S. This is a rainy day, but some silk-worms are spinning, and those in the rear are very thrifty.

I have *morua multicaulis* cuttings growing in a pure bank of *blue* marl, and the leaves are of a deeper green than those growing out in the fields.

* We cannot answer this question from our own experience.—ED. F. R.

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THE FARMERS' REGISTER.

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JUNE 30, 1840.

No. 6.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

LUCERNE, OR FRENCH CLOVER.

From the New England Farmer.

A correspondent asks for information respecting *lucerne*, particularly whether any experiments have been made with it in this section of country. We wish some of our friends would give us information on this subject; in the mean time the following selections afford the best answer we can give our friend at present.

"I have read with great interest the letter of Mr. John Lowell, in the Monthly *Genesee Farmer* of November last, and quite concur with him in his opinion of the value of *lucerne*. My impression is that two or three acres of it used for soiling cattle, would add one-third to the produce of a farm of one hundred acres, both from the greater number of cattle that could be kept on the farm, and the larger quantity of manure that could in consequence be made, so that its good effects would be seen in all the crops. I beg to offer you the result of my experience in cultivating it here.

"The very rapid growth of weeds in this country is a very great difficulty in the way of the cultivation of clover; so much so, that I have found it impossible to grow it in drills, as the practice is in England. I sowed three quarters of an acre of it in drills in 1834; in 1835 it cost me \$53 to weed the crop, yet in 1837 half of it was already choked by the growth of grass, clover and other herbs. Part of it too was killed in hollows where the water lodged in winter. Seeing the culture by drills so unsuccessful, I sowed some *lucerne* seed broadcast and thickly, in a square plot of sandy loam, in my garden, on the 19th of July, 1836. In two months after this was sown I pulled out a root, which then measured 30 inches from the top of the leaves to the point of the root. In 1837, it was cut on the 9th of June, and on the 9th of every subsequent month to October, growing each month about 18 inches. It was cut also five times in 1838, and if the spring had not been so cold, I think it would have been fit to cut by the middle of May, as it began to sprout in April, but was choked by the cold; the temperature having decreased in the latter half of the month of April. The conclusions which my experience seems to afford, are the following: 1st. That *lucerne* should be thickly sown, (Mr. John Lowell says 20 lbs. to an acre,) upon sand or sandy loam, with slopes sufficient to carry off water, and without hollows in which water can lodge. 2d. That in order to prevent grass and weeds creeping into the *lucerne*, there should be a border round it of 5, 6, or more yards in width, in which should be grown every year, mangel wurtzel, potatoes, or other roots which require the soil to be well weeded.

"*Lucerne* would be best, preceded the previous year by a crop of potatoes to prepare the land, and as it needs not be sown till the end of May or early in June, the land may be ploughed once or twice previous to the sowing.

"*Lucerne* will grow vigorously on pure sand; for a gentleman who has recently resided at Dunkirk in France, tells me he was surprised to see its

great growth on the pure sands adjoining that town.

"I have known *lucerne* to continue to grow for sixteen years in England."—*Genesee Farmer*.

The following dialogue is from the pen of the author who furnished those published in our previous numbers. We take it from the '*Cabinet of Agricultural Knowledge*.'

We are happy to announce that the author of those interesting dialogues is about to publish them in book form, revised and enlarged. The book will be a valuable one in every farmer's family.—*Farmers' Cabinet*.

Dialogue between a father and son—*Lucerna*.

Frank.—Father, you said you would tell me more about the island of Jersey—since then, I have seen an account of the growth and produce of *lucerne*—a crop which you say grows there—which is truly astonishing. I find that it yields four crops for hay during the summer, and after that, abundance of feed for cows and sheep. Is it a species of meadow grass or clover?

Father.—It is much like a narrow leaved clover, but the blossom is very unlike, being of a beautiful blue color. The growth and produce is, as you say, truly astonishing; and having had repeated opportunity to make myself acquainted with the crop and in every stage of its growth, from its cultivation, I am able to speak very decidedly to its great superiority over every other, provided the soil be suitable, and the culture well attended to. The crops to which I allude were so remarkably productive, and I had such constant access to them, that I was induced every evening to enter into a journal, whatever had transpired during the day, worthy of observation; but for this circumstance, it would be out of my power, at this distance of time, to speak so decidedly as to their rapid growth and large yield: I have now, however, an opportunity to quote *chapter and verse* from this journal, which I will do, for your information.

The Rev. Mr. P. having a field of an acre and a quarter, which had been suffered to run to weeds and bulrushes, determined to clean it, and seed it with *lucerne*; he had it therefore trenched with the spade, to the depth of the staple of the land, which was in some places very shallow, the substratum being a hard gravel. By this operation, the richest part, or surface soil, was turned down on the gravel, and the subsoil was brought to the surface, to be enriched by future dressings. The work was done for fifty cents per perch, of twenty-two feet square, and the seed was sown broadcast and harrowed in by hand. On the appearance of the plants, they were not supposed thick enough to form a crop, but by careful management the field has produced immense crops, both of green food and hay. The journal commences with

Field No. I.

September 18th. Mr. P.'s field of *lucerne*, measuring one acre and a quarter, after soiling two

horses and a cow during the whole of the summer, has already given three crops of hay, on that part of the field which has not been cut for soiling, to the estimated quantity of five tons. The fourth crop, now growing, measures two feet in height.

Sept. 21st. The fourth crop of lucerne mown this day for hay.

Sept. 24th. The hay carried in in excellent condition: the weather having been dry and hot, the only preparation requisite was, to turn the crop once; this crop is equal to any of the preceding cuttings.

Sept. 26th. A portion of the field from whence gravel had been dug, and the part levelled, has always dried up after producing one crop of hay in the summer, the substratum being impenetrable: that spot has this day been covered to the depth of five inches with fresh earth, preparatory to trenching and resowing.

Oct. 18th. The trenching of the gravelly spot has been delayed, but the shoots of the lucerne have penetrated the earth through a space of five inches, and it is now determined to allow it to remain untrenched.

Nov. 23d. A fifth crop will not come to sufficient maturity for hay, but there is excellent food for horses and cattle.

April 8th. The gravelly spot is the best and earliest part of the field; scarcely an inch in space, without a vigorous shoot of lucerne.

May 6th. Commenced mowing the crop of lucerne for soiling, a remarkably heavy crop, more than two feet in height.

11th. The first crop mown for hay this day. A space six feet square, taken as a fair average of the field, yielded twenty-three pounds in weight as soon as cut; after one day's exposure it had lost eight pounds in weight, showing that a gallon of water had evaporated in twenty-four hours from this small quantity of green food.*

23d. The hay carried in in good condition—not injured by five rainy days, the crop lying light, by means of its large stalks, requiring only careful turning now and then.

June 26th. A second crop mown for hay, measuring two feet eight inches in height. The weather has been remarkably hot and dry, the result has been, a growth in the crop of two inches in height every twenty-four hours, the last four days.

July 17th. The third crop of lucerne measures seventeen inches in height; the weather is extremely hot and dry, all the meadows are parched, and farmers are compelled to feed their cattle on hay; the lucerne grows away as though it had a shower every night.

22d. The crop on the gravelly side has again failed; a first and second crop come earlier and grow more vigorous on this part of the field than on any other; but after that, it suffers from a want of depth of soil, affording a familiar illustration of the parable of the sower, (Matth. xii. 5th and 6th verses.) The seed which fell on stony ground immediately sprang up because it had not much depth of earth, and consequently soon felt the influence of the sun, but when the sun was in full vigor, it was parched, and for want of nourishment withered away.

Aug. 7th. The third crop of lucerne mown this day for hay; a very heavy crop, many of the

plants in blossom. From the first to the second mowing, one month and fifteen days; from the second to the third cutting, one month and eleven days; and after this the field was rented to a tenant for £30 sterling per annum.

Field, No. II.

Sept. 5th. A piece of land was sown this day with lucerne seed of this summer's growth, unaccompanied with any crop.

March 20th. The lucerne sown on the 5th of last September, with seed of that summer's growth, has stood the severity of the winter, and the crop measures six inches in height this day.

May 4th. Cut the first crop of lucerne this day, two feet in height.

June 14th. A second crop mown this day, equal to the first.

July 14th. The third crop mown this day, twenty-six inches in height.

August 24th. The fourth crop was mown this day, equal to any of the preceding.

Sept. 5th. It was on this day last year, that this crop was sown with seed of that summer's production: the fifth crop from which measures a foot in height this day.

Field No. III.

Major T. sowed a field with lucerne, in May of last year, unaccompanied with any crop; three heavy crops were taken for soiling during the summer, and on the fourth of May of the present year, it was mown for hay, a very heavy crop: thus giving four crops in the space of one year from the time of sowing the seed.

Field No. IV.

Colonel T. has a field of lucerne of four acres, in full vigor; the crop, after cutting, measured three feet seven inches in length. He mowed a third crop for hay from this field on the 21st of July.

Field No. V.

M. A., esq., in breaking up an old unproductive meadow, for the purpose of seeding it with lucerne, adopted the following mode. In September, the land was ploughed to the full depth of the soil, and sowed with winter tares, or vetches. These were cut for hay in May, and yielded three tons per acre. The land was immediately ploughed and repeatedly harrowed, and the weeds were collected and burnt: a plentiful crop of seed weeds soon made their appearance, which were ploughed down; the land was again harrowed, and the weeds were again collected and burnt: this was repeated until the soil was as clean as a garden, when it had a very thick coat of well rotted stable dung, which was very carefully turned in, and lucerne seed was sown in September, without any other crop; and during the next summer it was cut five times, either for soiling or for hay: the fifth crop for soiling was commenced cutting on the 25th September.

So far the journal, which needs no comment.

From the Zanesville Gazette.

LUCERNE, OR FRENCH CLOVER.

Lucerne, sometimes called "French clover," is a kind of grass, which, in some situations in Europe, is cultivated with great advantage, and has

* Twelve tons, eight hundred and fifty lbs. per acre.

been tried in some instances with great success in this country. It is not, strictly speaking, a clover, though in some respects similar. It is perennial—in favorable soils, the roots are said to live and flourish a hundred years. Its advantages consist in affording a greater amount of foliage for any kind of stock, than any other plant, according to the expense of producing it. Several years since, while residing in the state of Maine, we made several experiments with lucerne, which, although some of them terminated unfavorably, satisfied us that the most favorable soil for it is a deep sandy loam: and as the alluvial soils on this river are generally of this character, we last spring resolved on giving it a trial here. We procured from Boston, a small quantity of seed, which was sown on the river "bottom," the last week in May. As the soil had been badly managed for several years previous, we had feared that the great growth of weeds would check and smother the lucerne, and to guard against this, and get a chance to extirpate the weeds, we sowed the seed in drills. This was done very expeditiously and exactly, with one of Ruggles, Nourse & Mason's seed sowers.

In the latter part of the month of July the lucerne had reached the height of 18 inches on an average, and had considerably blossomed. We cut it and fed it green, partly to hogs and partly to milch cows—both ate it voraciously.—In just four weeks from the time it was cut, it had again grown to nearly the same height as before, and was cut a second time—and the first of November it was cut a third time—the crop being heavier than either of the preceding. A piece of common red clover [very flourishing] immediately adjoining, the soil precisely similar, did not yield near *half* as much in proportion, as the lucerne.

We have no doubt that it may be cut five times another year and will yield at the rate of a ton and a half of *hay* to the acre, at each cutting.

AGRICULTURE OF FRANCE.

(Continued from page 270.)

Potatoes have not been long cultivated, even as a garden crop, in France, and as a field crop to any extent, or under good management, they are yet comparatively little known. The Lyonnais was one of the first districts in France where they were cultivated. At their introduction, they were called white truffles, from the root resembling the truffle in form, and from their being dry, like a truffle, out of the ground. It is computed, that since this valuable root was brought into general use in the Lyonnais, the consumption of corn has been lessened one-third; the inhabitants give them to their cattle and poultry, and the poultry of this district is highly celebrated. Soon after M. Turgot was appointed intendant of Limoges, A. D. 1761, he introduced into his generality the cultivation of potatoes. The people at first regarded this root with apprehension, or disdain, as beneath the dignity of the human species; and they were not reconciled to it, till the intendant had caused it to be served at his own table, and to the first class of citizens, and had introduced it among the fashionable and rich. At present, a vast quantity of potatoes, of a tolerably good qua-

lity, are grown in the provinces of Poitou, Normandy, Limosin, Gatinois, and the Isle of France, as well as in less quantities in other districts.

Cabbages are cultivated in French Flanders, Alsace, and a few other districts. In the neighborhood of Strasburg, particularly, this plant is cultivated on a very extensive scale, but almost entirely for the consumption of Holland and Mentz, to which places it is calculated that cabbages to the value of above 30,000 crowns are sent annually. In French Flanders, the *brassica arvensis* of Linnæus, there called Colza, is cultivated in astonishing quantities by the farmers. There are two kinds of colza, one called white colza, because the leaves of the flower are white; the other, cold colza, the leaves of which are larger and thicker. It has this name, because it supports better the rigors of winter. This plant is cultivated on rather a strong rich soil. There are two modes of sowing it; either in a nursery to be transplanted, or in the usual mode. The white colza requires less manure than the cold colza. The seed is commonly ripe about the end of June or July. The plant is cut with a sickle, having a sharp edge. Colza, intended solely for winter food, is sown in June, in a field prepared for the purpose; it is cut, and given to the cattle in the course of the winter; and afterwards the stalks are cut some inches above the surface of the earth, and they will furnish a second crop of leaves in the spring. Colza furnishes the best oil that can be extracted from the soil of the north. In the central parts of France, the oil of walnuts supplies the want of the colza, which is but little cultivated there. The mass remaining after the extraction of the oil, makes a good winter food for cattle. The corn that is sown after this plant is generally both abundant, and of excellent quality.

Rape is extensively cultivated in French Flanders, Artois, &c., but not in the other districts of the kingdom. The plants are raised on a small quantity of ground that has been fallowed, well dunged and worked repeatedly by the binot or plough. The rape is afterwards transplanted into a field, that had formerly produced winter barley, or winter wheat. The young plants are put into the ground, either by the dibble, or by the plough. Rape is grown either as green food for sheep, or for the sake of the oil. The latter is the more common, as well as the more profitable. In a small circle round Lisle, there are 450 windmills for extracting oil from the seeds produced in that neighborhood. In the year 1810, the product was estimated as follows: 1st, 180,000 picotolres of oil, at 109 francs each, in English money 817,580*l.*; 2d, The cakes valued at one-sixth part, 136,260*l.*; the total value of the produce 953,840*l.* The crops of wheat after rape in French Flanders, are reckoned to be better than those that are grown after fallow. Poppies are also cultivated in the northern districts of France for their oil.

In the same district of France, where indeed the most spirited and successful agriculture is carried on, spurry (*spergula arvensis*) is cultivated. After the crops have been reaped, the grain is slightly ploughed and sown with it. In October, the cows are tethered on it. The butter from the milk thus obtained, is called *spergula* butter, and it is employed for the use of the kitchen, as being both cheaper and more profitable than any other for that purpose.

In some parts of Brittany, parsnips are cultivated. The seed is sown in February or March, and the parsnips are raised out of the ground in October or November. They are chiefly employed in fattening cattle and hogs. Lupins (principally *lupinus albus*) are grown very extensively in the southern districts, either on the wheat stubbles, as winter food for their flocks; or for the sake of the seed, which is eaten by the inhabitants. Of all the species of clover, trefoil, or yellow clover, is most abundant, especially in the south. It is generally sown as forage on the wheat stubbles. In the district of the Pyrenees, these are ploughed in the beginning of August, and the clover seed is harrowed, or rather rubbed in, by means of a piece of wood fixed to the plough. This clover produces much luxuriant and valuable food for sheep and lambs early in the spring, after which it is watered, and produces by the end of May a full crop of hay; it is then ploughed up, and haricots, maize, or millet planted, either of which is off in time for putting in wheat. The other kinds of clover, till very lately, were scarcely met with any where, except in French Flanders; but within these very few years, what the French call *prairies artificielles*, which were less properly artificial grasses, have been introduced into several districts. Still these and turnips, the two grand distinguishing features of good husbandry in Great Britain, are comparatively little known or valued in France.

The case, however, is very different with respect to lucerne and sainfoin. The culture of the former is one of the principal features of French husbandry. It is the *medica* of the ancients, so called because it came originally from Media; and spreading through Persia, it became at length known to the Greeks, who cultivated it assiduously, and recommended it highly. From Greece it was transferred to Italy, and before the time of Cato or Virgil, it was in the highest credit with the Romans. It flourished with them as long as their empire flourished. Before the destruction of the empire, it seems to have been carried into Spain; or perhaps it was introduced there by the Moors, with whom, during their abode in that country, it was in high esteem. When the arts revived, it returned again into Italy, and was assiduously cultivated in that country, especially in the kingdom of Naples; thence it advanced into the southern part of France; and from the place where it was first or principally cultivated, it was called *grand trefle*, *trefle*, or *foin de Bourgogne*. The era of its introduction into France is not accurately known; but as it passed from that country into the Palatinate upwards of 250 years ago, it of course must have been longer cultivated in France. It is now grown in Picardy, Isle of France, Roussillon, Languedoc, Gascony, Poitou, Touraine, Artois, Normandy, Dauphiny, and Provence, to a great extent, and partially in other districts of the kingdom. It is invariably sown broadcast, and generally without corn, though sometimes with oats. It is cut for the first time, in the southern districts, about the end of April; in the northern districts of course later. Where irrigation is practised, it is watered every 40 days after the first cutting, to the extent of five cuttings in all. If the land be not watered, it is cut thrice with a full product, where the soil and climate are favorable, and the management good. The wa-

tering, however, brings it to maturity, or rather decay, comparatively quickly, since in this case its duration is not above seven or eight years, but on other lands twelve, sixteen, twenty, and even thirty years. In some parts of Roussillon, they take three crops of wheat after lucerne. This crop is apt to get weedy. In which case, in some of the southern districts, it is cleaned by means of ploughing it in the winter with a narrow pointed share, during frosty weather. This operation, performed at this season, kills the weeds, but does not injure the lucerne. Where the land is not very rich, or where it is not intended to crop it severely, the practice of sowing wheat after it, is not pursued; but barley and oats cut green, or made into hay, and not suffered to ripen, are taken. By this management, the roots of the lucerne, which are not easily or soon eradicated, and which would prove injurious to crops of corn, are turned to advantage, the shoots from them mixing with the forage of the barley or oats. The produce of course varies considerably in weight. In the neighborhood of Liancourt, where it is well managed, three cuttings will yield 1600 bottles of hay, each of 12 lbs. or 19,200 lbs. which is above seven tons the English acre. In general, the crop may be estimated at 12,000 lbs. or rather more than five tons the English acre. The hay made from the two first cuttings, is generally given to horses. The hay from the three cuttings to cows. We have been thus particular in our account of the lucerne husbandry of France, since, as we have already remarked, it forms one of its best and most distinguishing features.

Sainfoin is not nearly so generally cultivated, and certainly by no means so well managed, nor so valuable a crop, either in its actual produce, or as a preparation for other crops, as lucerne is. In England, sainfoin generally lasts from eight to twelve years. In France, it seldom lasts more than four or five years. It is usually sown with a second or third crop of corn; and, in some places, the farmers do not think of this grass till their lands are so full of weeds, and so exhausted, that they will produce corn no longer. This management, and the circumstance that their leases are generally short, seldom extending beyond nine years, sufficiently accounts for this crop not being kept in the ground so long as it is in England; for certainly, with respect to soil, France is peculiarly favorable for this crop; and yet in some of the districts where it might be introduced with great advantage and profit, it is not grown. The culture of tobacco was formerly prohibited in France, except in certain parts: as Pont de l'Arche, Normandy, Verua, in the department of the Marne, Picardy, Mont Auban, Tonnang, a small town in the department of the Lot and Garonne, Clerac, another town in the same department. Hainault, Artois and Franche Comté were similarly privileged; but the soil of these provinces was decidedly hostile to the cultivation of the tobacco plant. At present, it is principally cultivated in Alsace. The average produce of France is estimated at twelve millions pounds annually; but the quality is not good.

It has already incidentally appeared, that millet is cultivated to a considerable extent in the southern districts of France. In some parts of Gascony, it is sown on three feet ridges, with three irregular rows on each ridge, and carefully

hood. In other parts, it is sown ridge for ridge in the same fields with rye. In order to free the millet from its chaff, the French pound it in a wooden mortar, or pass it between millstones, which they keep sufficiently asunder, to prevent the grain being crushed. In the southern parts of France, especially in the vicinity of Bourdeaux, they prepare from the winnowed millet seed boiled in milk, a very favorite mess, not unlike rich milk; they also make the seed into cakes, pastry, &c. Millet is a grain, that thrives well under irrigation, which is liberally bestowed upon it in the district of the Pyrenees.

The harvest in the south of France generally commences about the middle or end of June, in the central provinces about the middle of July, and in the north of France about the beginning of August; but in the high grounds, especially in Auvergne the harvest is very late, oats being not unfrequently green in the middle of August. It has already been mentioned, that women are principally employed in the harvest operations: indeed, agricultural operations of all kinds are conducted more frequently, and on a more extensive and independent scale, by them in France than in most other countries. The Hainault sickle is used in French Flanders, and in parts of the north and east of France: The sickle more generally, and the common scythe in some districts, even for the wheat. The harvest operations are by no means carried on with neatness or method; and the excellence of the climate is such, in most parts of the kingdom, that these deficiencies are seldom attended with much loss.

Scarcely any corn stacks are to be seen in France; by far the greatest part of the corn being either put into barns, the size of which, in some districts, is enormous, or thrashed out immediately after harvest, in the open fields; this mode of thrashing, however, can be practised only in the southern parts of the kingdom. There harvest is not considered as finished till the thrashing is done. Where it is performed by the flail in the open field, the thrashing-floors are generally in a corner of it, thrashing-floors they may be called; for all the preparation is merely shovelling aside the loose mould, and a good sweeping. The size of course is in proportion to the number of people, which is from two to twelve; rarely more than the latter. They thrash and winnow about seven Winchester bushels in a day. Where the corn is trodden out, instead of being thrashed by the flail, horses and mules are employed: oxen, which are used in most of the other operations of husbandry, are seldom or never employed in this. The number of horses or mules varies: sometimes there are four mules and four men; sometimes only two mules and two men; sometimes twelve or fourteen mules or horses together, and sometimes even as many as twenty-four. The mules or horses, as well as men, are generally hired, at forty sous for each mule or horse, and the same for each man: the latter have their board besides. With 24 horses or mules, their drivers (who are paid in kind, three sacks per hundred of the grain thrashed,) and 15 men, it is calculated that they can thrash of wheat from 120 to 180 bags of 200 lbs. per day; at an average of 150 bags per day, it costs about 4d. per English bushel. The common practice is to lay three or four layers of wheat,

barley, oats, &c., upon some part of the field, generally under a central tree: the horses and mules are then driven upon and around it, in all directions, a woman being in the centre, like a pivot, and holding the reins: the horses are sometimes driven by little girls. The corn thrashed out is cleared away by the men; others winnow it; others heap it; others supply fresh layers. After the corn is separated, they continue treading the straw, until it is reduced almost to chaff, to improve the fodder, and forward the maturation of the dung. Such is the stability of the climate, that this process is going on in the open air, through the whole country, without any means of protection against a sudden change. Indeed a soaking rain could not possibly do harm, as a day's sunshine, or even the heat of the night, would soon evaporate it.

The means used in France to improve the soil or particular crops are, manures, draining, paring and burning, and irrigation. In most of the districts, there is nothing very peculiar in the manures employed, or in the mode of managing them. The small towns and villages, in the autumn, present a disagreeable scene; from one end to the other they are littered with straw, like a farm-yard, for the purpose of its being converted into a manure, so that it is like walking all the way upon a dung-hill. When the straw becomes sufficiently saturated, it is piled on each side the door of the proprietor's house, to make room for fresh straw being laid on; so that, besides the dung-hill in the street or path, there is a range of them on each side. In French Flanders, very minute and particular attention is paid to the subject of manure. In the vicinity of Lisle, the dung of cattle and horses with the straw, ashes, lime; the urine of animals collected with care in brick cisterns; the cakes of rape and hemp-seed reduced to powder in a mill, and sometimes put in the urine cisterns; sour water, obtained by washing the tubs of starchmakers; the urine of cattle fattened at the distilleries, which sells at a high price; the dung of pigeons; that of sheep carefully gathered; marl; the refuse of horns, and night soil, are carefully and judiciously employed. Although the price of this last article is only 3d. per ton to the scavengers, and 9d. to the farmers, the town of Lisle alone produces as much as would sell for about 4200*l.* a year. Besides these manures, Dutch ashes are extensively employed as a dressing for clover: these are the ashes of the peat or turf, brought principally from Friesland: by their application, great crops of clover are raised, and the subsequent crops are also improved. From the nature of the soil and climate, draining is requisite only in very few parts of France; and in the practice, there is nothing particular or commendable. The marshes in some of the sea districts have been partially drained, but this improvement is by no means carried on with spirit. Louis XIV. made a present to Marshal Turenne of the marshes of Bourgogne, in the department of Isere, on condition that he would drain them; but neither he nor his successors have ever accomplished it. In some provinces, a singular kind of husbandry is practised; the ponds are drained, and cultivated for a few years, till they lose their fertility, when the water is again permitted to accumulate, and the same process is repeated. Respecting paring and burning, which

is very partially practised, and scarcely ever for any other purpose, or at least with any other effect, but to impoverish and exhaust the land, it is unnecessary to enter into details.

Irrigation is the most remarkable feature in the mode of improving land in France, or to speak more correctly, in the mode of increasing its fertility,—and its effects are wonderful. Irrigation, however, is by no means general: in travelling from Calais to the Pyrenees, Mr. Young observes, he first met with it in La Marche, between La Ville au Brun and Bossie, after he had passed over considerably more than half the kingdom; thence it is practised, with little interruption, to the Pyrenees, and the whole district of those mountains from Perpignan almost to Bayonne is watered. Through all the north of France, comprehending every thing north of the Loire, there are only a few imperfect traces of it in some parts of Normandy, and in the Beauvoisis. In Picardy, Flanders, Artois, Champagne, Franche Comté, Burgundy, and the Bourbonnois it is unknown. In Alsace and Lorraine, it is partially practised for their meadows. On the whole, hardly more than one third of the kingdom can be said to understand and practise irrigation.

But where it is practised, it is upon a large scale, and with wonderful spirit and success. By means of it, artificial fertility is conferred on some of the barren mountains of the Cevennes. As the waters that run down the sides carry considerable quantities of earth into the ravines, walls of loose stones are constructed, which permit the waters to pass when they are clear; but when turbid, their load of earth is gradually deposited against the wall, and afford a quantity of excellent soil. Successive ramparts are thus erected to the very top of the mountain; and the water having no longer a violent fall, nourishes, instead of injuring the crops. In order to give security and consistence to the new acquisition of soil, fruit trees are planted at certain intervals. Perhaps the greatest exertion in irrigation to be seen in France, occurs in Languedoc, in the vicinity of the town of Gange: a solid stand of timber and masonry is formed across a considerable river between two rocky mountains, to force the water into a very fine canal, in which it is, on an average, six feet broad by five deep, and half a mile long, built on the side of a mountain, and walled in; a wheel, with a hollow periphery, raises a portion of the canal to the height of 30 feet; an aqueduct conducts it on arches built on the bridge, across the river, to water the higher grounds; while the canal below carries the larger part of the water to the lower fields. Meadows are watered in some parts of Gascony, and in the vicinity of Avignon;—an unusual thing in the south of France.

But the most extraordinary instances of irrigation, are to be met with in the singular desert of La Crau, already described, and in the Pyrenees. In advancing from Salon into the Crau, about four miles before it commences, the road crosses the canal of Borsgelin. "The old canal of Crappone, at the same place, is seen distributing water in various directions, for the amelioration of one of the most arid tracts that is to be met with in the world. The canal of Crappone takes its water from the Durance at La Roche, and carries it to the southern part of it at Tournes. This canal is 40

miles long. That of Bois Selin receives it from the same river at Malavort, and crossing the other, divides it into three branches: one of which leads to the lands in the neighborhood of Istres; the second to St. Saumus and Magran, and this part of the Crau; the third is a small one that turns to the left towards Salon. In consequence of water being thus conducted to a region where it is so much wanted, some very capital improvements have been wrought. Some large tracts of the Crau have been broken up, and planted with vines, olives, mulberries, and converted into corn and meadow." The corn has not succeeded; but the meadows, according to Mr. Young, are amongst the most extraordinary spectacles that the world can afford, in respect to the amazing contrast between the soil in its natural and in its watered state, covered richly and luxuriantly with clover, chicory, ribgrass, and *avena elatior*.

In describing the irrigation of the eastern Pyrenees, we shall use the words of Mr. Birkbeck, who in his tour through France in 1814, observed every thing relative to its agriculture with the eye of a most shrewd and intelligent observer, and who has recorded his observations in the most clear and impressive manner.

"The copious and pure streams issuing from the Pyrenees, from their source to their union with the Mediterranean, are most economically and skilfully directed to the purpose of irrigation. On the mountain sides, the streamlets, as they trickle from the rocks, are collected into channels, above every little portion of arable ground, which they render surprisingly fertile. These rills uniting, form larger streams; and these, with great labor and ingenuity, are kept up by artificial channels, and only suffered to descend as they perform the office of irrigation. The same attention is paid to the larger streams united, which become a considerable river in the lower lands of Roussillon. This is divided and subdivided, unites, and is again divided, so that every portion of the surface seems to enjoy its due share. The soil of Roussillon is sandy, and apparently not very rich; but, by the joint influence of water and sun, vegetation is vigorous beyond any thing I had ever before witnessed. Where a mountain side, or a portion of the land, is so situated, as to be inaccessible to the water, it is planted with vines, to which watering is not applicable, as it injures the quality of the wine, without increasing the quantity sufficiently to compensate. On the contrary, to olives, irrigation may be applied with prodigious advantage, an instance of which came under my observation. This crop had generally failed, owing to the extraordinary coldness of the early part of the summer; and one-half of a large olive ground was, like the rest of the country, without fruit; the other half, which had been watered several times, was laden to a degree equal to the most plentiful season. How this country, and other valleys of the Pyrenees, were originally laid out so judiciously with channels of irrigation, systematically arranged for the benefit of the whole, is a mystery I have not heard explained. A master's hand seems to have planned and executed all, before the appropriation of the soil, otherwise private interest would have interfered and marred the design. However that may have been, every man now finds a "*canal d'arrosment*," passing above his field, and a "*canal de dessèchement*," at the

bottom, which latter is the "*canal d'arrosement*," in its turn for the land below.

The manner of applying the water is extremely simple. A dam is made across the upper channel, from which the water flows gently into a furrow made by the plough along the higher side of the field, and in a few hours soaks through the whole soil, until it reaches the lower side, which completes the operation.

The following, which is one of the usual practices of the district, may show what this amphibious husbandry can effect. In August, they *scratch* the wheat stubbles with their little Roman plough, which does not turn a furrow, or move a fourth of the surface. They then sow annual trefoil, which they cover very slightly by planking, that is, drawing a plank on which a boy rides, over the land, thus breaking the clods and smoothing the surface. This is equivalent to our rolling, as the scratching is to our ploughing. The weeds and stubble are but little affected by this process of ploughing and planking. However, that matters not, for the water is now introduced; the trefoil starts as it were instantaneously; and in October or November is three deep and fed off by the sheep. Water is applied from time to time; and in January or February it is fed again; and lastly, in May it is mown for hay, a heavy crop. Immediately as the hay is removed, another *scratch* is given, millet or haricots are sown, irrigation goes on, the crop is reaped, and the ground receives four ploughings, as a preparation for another crop of wheat, to be sown in October or November. This is the history of one year, under familiar and constant practice."

The richest arable land, when watered, sells for nearly double what land of as good quality not capable of being watered will bring. Besides the districts already mentioned, where irrigation is practised on a large scale, and with great skill and effect, every spot of land in the mountains of the Limosin is watered; and a considerable part of the vale of the Limange of Auvergne, as well as some of the mountainous districts of that province. At Isoire near Clermont, the gardens are planted in quick succession by means of it. There are also here what they call *vergers*; that is, watered meadows planted with apples and other fruit trees, which are very productive. Irrigation is applied to the culture of hemp in Auvergne.

Besides the improvement of the mountainous districts in the centre and south of France by means of irrigation, by another process, calcareous mountains, which generally rise in shelves, are rendered productive by cutting away the rock behind the shelf, which supplies materials for a low wall around the edge. The interval is afterwards filled with earth, and the barren mountain is crowned with luxuriant terraces.

It must have sufficiently appeared, from the account already given of the agriculture of France, that the meadows and pastures of that country bear a very small proportion to the arable land, and that comparatively little dependence is placed on their produce, for the breeding or fattening of cattle or sheep. Indeed, as the cattle and sheep of great tracts of arable land are entirely supported on clover, lucerne, &c., and as the climate of by far the greatest part of the kingdom is not well suited for meadows or pasturage, the French agriculturists have little reason to regret, or alter this

feature in their husbandry. The author of the *Credit National* calculates the meadows at 15,000,000 arpents: that is, at one-fourth of what he makes the arable. But Mr. Young conceives that they do not amount to one-third of that quantity, and estimates the meadows and rich pasturage together at 4,000,000 English acres; not one-seventeenth of the arable land. This seems a very small proportion; but it will not be deemed too small, when it is recollected, that in those districts where in England we find extensive meadows, that is, by the sides of the rivers, there are in France very few, and those very inconsiderable. For instance, the plough moves to the water's edge of the Marne. There are very few meadows on the banks of the Loire. The Seine is bounded either by hills covered with wood, or by gravelly plains under tillage. The land near the Garonne is principally arable; and the Rhone presents rocks and vines on its banks through the greater part of its course. On the smaller description of rivers, indeed, there are meadows, especially on the banks of the Saone; but it is evident that these, taken together, can form a very small proportion indeed of the area of France.

The most extensive, and certainly the most fertile pasturages in France are to be found in Normandy. The moisture of the climate, aided by the generally deep and rich soil of this province, is extremely favorable to the pasture; and as the farmers here are certainly equal at least in intelligence, capital, attention and skill, to those in any other part of France, those advantages are turned to the best account. The grazing lands of the Pays d'Auge are particularly celebrated; and of these, the valley of Corbon may perhaps class with the finest to be found in any country. In 1789, when Mr. Young visited these pasturages, the rent of the highest was about 4*l.* 7*s.* 6*d.* the acre, measured by the perch of 22 feet; and the price about 87*l.* 10*s.* the acre. In several of the provinces, there are also salt marshes that are applied as meadows, to the fattening of cattle, particularly in Normandy, about Isigny and Carentan, in Poitou, Saintonge, Languedoc, &c.

The management of hay in general is very slovenly. It is not unusual to see the produce of a field carried away in sheets and blankets, or even in the arms, and one-fifth of the crop lying scattered in the roads and the fields. It is in general too much exposed to the sun. The women here, as in all the other parts of agricultural labor, perform the principal part of the work, even pitching the hay into the cart. The fork they make use of for this purpose is a very awkward one. In the central and southern provinces, where the climate is very steady, the farmer stacks his hay in small cocks where it grows, and only carries it away at his leisure. When carried to the hay loft, being merely thrown together without being trodden, it loses the little fragrance, which a burning sun acting on it, while it was making, had left it. The clover hay, however, especially in the northern provinces, is better managed; after standing for some days in large cocks, it is tied with straw bands, in bundles of 14 lbs. each. The lucerne also, in these districts, is got with great care, so much, indeed, that the color is beautiful; the green is often not in the least faded, but so vivid that it almost appears improved in drying.

Normandy, the Limosin, Auvergne, Brittany,

Franche Comté, Poitou, and Burgundy, are most celebrated for their breed of horses. Normandy has long been noted for its horses. It is said that William I. won the decisive battle of Hastings, by the superiority of his cavalry which he brought over with him. The Norman horses are in general low and thick, and very steady, sure, and strong. They will make a stage of 30 miles without a bait, and eat the coarsest food. They, as well as the horse in other parts of France, and also the cattle, are accustomed to feed about the lanes, and in the common fields; after the corn is carried off. The best saddle horses are those of Limosin. They are seldom fit for riding till they are six or seven years old; but then they are very useful, and last a long time. This breed has been lately much improved, by crossing it with the Arabian, Turkish, and English. Auvergne produces some good hacks for common use. A great many foals are reared in Brittany, which are sent to the pastures of Normandy. A great many horses are also bred in Franche Comté, especially in the hilly part of the country. One year with another, their studs produce upwards of 5000 colts, most of which are bought, when six months or a year old, by the horse dealers in Champagne, Burgundy, Brie, and Berry. The trade in horses is consequently an object of some importance and value in Franche Comté. In different parts of the kingdom, there have long been *Haras*, or *depôts de chevaux*, for the supply of the royal studs; and Bonaparte, sensible that cavalry is one of the main sinews of war, paid particular attention to the breed and supply of horses; but, as in many other things that he undertook, his plans were not calculated to produce the object he had in view, in consequence of the impatience, obstinacy, and tyranny of his disposition. On the whole, therefore, the breed of horses, and probably the number, are not equal to what they were previously to the revolution. In the year 1802, the total number was, of plough horses 1,500,000; horses kept at Paris 35,100; in all other towns 200,000; in the armies 100,000: making in all 1,835,100. With the respect to the number assigned for agricultural purposes, it may appear high, when we consider, that oxen are very much used not only in the plough, but in carts; and that where horses are employed in the plough, there are seldom more yoked than two. The number of horses in Paris is singularly small. Between 1802 and 1812, the number of horses, at least of those bred in the government studs, was probably much increased; but during the Russian campaign, in a few months of 1812 and 1813, the loss, according to the exposé of the year 1814, amounted to 230,000 horses, which it is stated, could not be replaced at a less expense than 105,200,000 francs. The price of farm horses in the northern districts of France is about 17l. sterling.

Mules are much employed in the middle and south of France, especially in the latter, for treading out the corn. Anjou carries on a particular trade for these animals, known by the name of *Mirebalais*. In the department of Aveyron, especially in the vicinity of Rhodéz, the principal town, they feed a vast number of mules, in which the inhabitants carry on a considerable trade; for it is said that during the two fairs that are kept yearly at Rhodéz, this trade brings in above 300,000

crowns. The breed of mules in Poitou, is particularly celebrated for their size and strength, and is in great demand all over France.

The provinces in which oxen and cows are principally bred or fattened, are Perche, Champagne, Lorraine, Alsace, Hainault, Flanders, Normandy, Brittany, La Maine, Anjou, Poitou, Berry, Nivernois, Burgundy, Limosin, Auvergne, Breasse, Languedoc, and Dauphiny. The prevalent color of the cattle in France, from Calais to the Pyrenees, is a pale reddish, or rather a cream color. This is decidedly the color of the cattle of the Limosin, which are an excellent breed, probably the best in France. From this district, numbers of fine oxen, fattened in winter, are sent to the Paris market, which is also supplied by those fattened in Normandy during summer. The cattle of the Limosin have short legs, strait and flat backs, well arched ribs, deep and heavy carcasses, and their weight from 60 to 80 stone, 14 lbs. to the stone. The most singular circumstance respecting them is, that they should be in excellent condition in the month of May, the season when they are usually driven from Limoges to the Paris market, as at this time of the year there is in most countries a scarcity of fat cattle, when they have not been fattened on spring grass; and any grass which they could have in a climate not very different from that of the south of England, could have but a small share in bringing them to the condition in which they reach Paris. The method by which they are brought into this condition is very extraordinary: they are put on grass till the beginning of November; then on *reves* or turnips. When the turnips fail, they give them rye-flour, prepared in a peculiar manner: the flour is mixed with water, so as to make a paste, which is suffered to stand till it ferments. In some instances the fermentation is promoted and accelerated by the addition of leaven. This rye-paste is never given to the oxen till it becomes sour. At first they refuse it; but when they take to it, they prefer this acid food to any other. A large ox will eat in this manner about 22 lbs. of the paste a-day: it is given thrice a-day. The oil-cake of walnuts is also given to oxen in the Limosin, with the greatest success. In some parts of this district, boiled potatoes and chestnuts are given; in other parts, boiled maize rendered tender by pouring boiling water upon it.

In other parts of France, oxen are fed on leaves. This seems to have been an established custom in the time of Henry IV., as it is particularly mentioned by Oliver de Serres, who wrote, under the auspices of that monarch, the *Theatre d'Agriculture*. The practice was formerly usual in England also, in time of Henry VIII., and even so late as the reign of Charles II., as appears from Evelyn. The leaves used in France are principally those of the beech. They are gathered when on the point of falling, or immediately after they have fallen, and are preserved as dry as possible by being covered with straw. The management of this mode of keeping cattle is best understood in Franche Comté and Auvergne.

Where the Rhone divides between Tarascon and Arles, an island or delta is formed, called Camargue. This island is nearly an equilateral triangle of about seven leagues each way. It was formerly covered with wood, but has for a great many years been cleared, and covered with

rich pasture. Vast quantities of sheep and cattle are bred and fattened here. About 3000 horses are computed to be bred annually, with oxen and sheep in proportion. The oxen are reserved chiefly for the supply of the marine at Toulon. They differ in color from those generally met with in the rest of the kingdom, being a small black breed, not unlike Scotch cattle. They make excellent beef. They are very wild, and often very mischievous; so that when the droves of them go to Toulon, they are always preceded by a man on horseback, with a javelin in his hand, who keeps at a short distance ahead of them, to warn people of their approach.

The Norman cows, similar to those of Alderney, are the most celebrated for the quality of the milk they yield. This province, especially the neighborhood of Isigny in Lower Normandy, and Brittany, especially near Lanion, in the department of the north, and the Boulonnais, supply excellent butter, both fresh and salt. Gournay, a town in the department of the Loire, is particularly celebrated for its market of fine fresh butter, which is chiefly consumed in Paris. In the neighborhood of Marseilles, where cows are seldom seen, milk is furnished from sheep and goats: butter is only made from sheep's milk: a kind of curd is also made from this milk, which is called *beurre frais*: it is made into little pots, and brought about by the country people for sale. Cheese is very little made in France. Languedoc, Provence, Brittany, Normandy, Forez, and Bresse, furnish it in the greatest quantity. That of Brie is esteemed the best. On the borders of the Saone are a range of hills, which from their excessive fertility are called *Monts d'Or*. Several villages are dispersed over them, in which a very small delicate cream cheese is made. They are sent to very distant parts in little boxes, made exactly to the size of the cheese.

It is calculated that the number of oxen employed in husbandry are about 3,208,000; feeding oxen 404,500; young oxen, 1,456,000; cows, 1,016,000; making a total of 6,084,500.

The native breeds of sheep in France are, 1. The Picardy, hornless, white faces, and silky hanging ears; these are probably a bastard Flemish breed; their wool is coarse, and of middling length. 2. The Norman, with red legs and faces, and coarse wool. 3. The Berry, resembling somewhat the South Down sheep; the wool fine. 4. The Rousillon, similar to the Spanish, with very fine wool. 5. Near Mirepoix, in the department of the Upper Pyrenees, there is a sort of sheep, resembling the Norfolk breed, with horns, black faces and legs. The leading characteristics of the native French sheep are their long legs, thin carcases, and coarse wool; the mutton in general is bad. The same characteristics prevail from north to south, except in the north the sheep are larger, stouter, and bear finer fleeces. These circumstances, however, principally arise from their being better managed in the north than in the south.

Louis XVI., in 1786, first established a flock of Merinos at Rambouillet. The produce, for some time, was given away. Recourse was then had to public sale. The sheep sold high, but the manufacturers did not give a proportionally high price for the wool. At this crisis, the revolution came on. There were at that period four principal es-

tablishments for Merinos, namely, those of Rambouillet, Alfert, Perpignan and Pompadour; but the revolution still farther depressed the demand for their wool. In 1811, Bonaparte published a decree, by which he intended and hoped to cover France with fine-woolled flocks; but, by this ill-advised measure, the final blow was given to the Merino breed. From that time they have been declining in France. In the exposé for the year 1814, it is asserted that Bonaparte's forced attempts to introduce the Merino breed of sheep, cost the government 200 millions of francs; and that, after all, so far from succeeding, the breeds of native sheep were rather deteriorated.

Sheep are kept in all parts of France, but principally in Rousillon, Languedoc, Provence, Dauphiny, Auvergne, Guienne, Gascony, Bearn, Marche, Limosin, Poitou, Maine, Anjou, Brittany, Tourraine, Champagne, Alsace, Franche Comté, Normandy and French Flanders. In most parts of France, the sheep are shut up in stables at night, and sheltered from the sun at noon, during the summer. They are generally folded in the fields till November. When the snow is deep, they are sometimes fed on the branches of trees. On the whole, the management of sheep is bad in France, especially in keeping them too hot during night in their houses, and too confined in their folds. The flocks are not large, seldom reaching 400.

On the mountains of the Cevennes, which run along the northern parts of the lower or eastern Languedoc, numerous flocks are fed in the summer on the aromatic herbs with which they abound. During the cold of the winter, they descend into the plains. But the most extensive and singular emigration of sheep is that which takes place annually, and as regularly as in Spain, from the Camargue, or Delta of the Rhone, and the desert of La Crau, to the mountains of Provence and Dauphiny, especially to the mountains of Gap and Barcelonetta, and back again. The migration to the mountains takes place in May, whence they return again in October or November, and sometimes earlier. The migration is not regulated by any other written laws, than some *arrêts* of the parliament to limit their roads to five toises of breadth. If they do any damage beyond that, it is paid for. The Barcelonetta mountains are the best, as they are covered with fine turf.

The emigration is conducted with all the order and regularity of the march of an army. The flocks belong to several proprietors, who reside principally about the Crau, at Arles, Salon, &c. M. Darluc, the author of the *Natural History of Provence*, as well as other writers, calculates the sheep kept in the Crau and the Camargue at one million. They travel in flocks of from 10,000 to 40,000, and are from twenty to thirty days on the journey. Among the shepherds that have the care of them, one is chosen as chief during the season. He regulates every thing relative to the march, and is treasurer for the company; all the money for the expenses of the route being lodged in his hands, and he paying for every thing. In order to check him, another of the company is appointed secretary. In his presence all payments are made, and he enters them immediately in his book. The rest of the shepherds form a council, whom the chief consults in case of any difficulty. To every thousand animals, three shepherds are

allowed, each of whom has his dog. In the centre of the flock, a number of asses march, carrying the provisions and baggage. The chief also takes his station in the centre: he issues the daily allowances of provisions, and transmits his orders, by his assistants, from this situation; and if any irregularity is committed, he is found there to receive the complaint. He also examines into any mischief which may be done by the flocks to the countries through which they pass, and pays the person who has received the injury: he next determines, whether it was occasioned by negligence or through accident: in the former case, the sum paid is levied on the offender; in the latter, it is taken from the common fund.

Besides the sheep there are always a number of goats which take the lead of the former. Some of the oldest he goats have bells round their necks. The discipline in which these are kept, and the intelligence which they display is remarkable. At the command of the shepherds, they either halt or proceed; and when the flocks rise in the morning, the moment these goats receive the order to proceed, they repair to their stations in the foremost ranks with great regularity. If they come to a stream, they halt, till the word of command is given, when they instantly plunge in and cross it, and are followed by the rest of the flock. When the flocks lie down at night, the shepherds and dogs still continue on the watch, relieving each other at stated intervals. When they arrive at the mountains, each shepherd has his particular district allotted him by the chief. The feed is hired at the rate of 20 sous each sheep for six months; and the price for the winter feed in the Crau and the Camargue, is the same. During the whole time of their stay on the mountains, the shepherds live almost entirely on bread and goat's milk, sleeping upon the ground in the open air.

The shepherds in France never inhabit a house: they go in the cottages in which their wives and families live, to take their meals, but sleep in their sheepfold, in huts made of reeds and clay, upon a mat spread on the ground: these huts are placed on wheels. The wages of shepherds are in general high; and they are a superior class of men, in all respects, to what they are in England. The wages of the chief shepherd are about 12*l.* sterling: besides this, he is allowed a certain sum, often three francs per head, for every sheep sold; his board at one and a half francs a day; and a cottage, rent free, for his family. The wages of the inferior shepherd is about 8*l.* sterling; and he has the same allowance for board as the chief shepherd.

The Pyrenees breed of shepherd dogs are particularly celebrated. They are black and white, of the size of a large wolf, a large head and neck, armed with collars, stuck with iron spikes, so that no wolf can attack them. But bears are more potent adversaries. If a bear can reach a tree, he is safe: he rises on his hind legs, with his back to the tree, and sets the dog at defiance. These dogs are fed entirely on bread and milk. In most parts of France, when it is necessary to catch a sheep, for the purpose of examining it, the shepherd orders his dog to drive the flock round his master, which he does by going round them in a circle, gradually decreasing, till the shepherd takes any one he wants.

The average weight of the fleeces of the native sheep of France is about 2½ or 3 lbs.; that of the Merinos about 6 lbs. The wool of the former, in general, is of an indifferent quality. The wool of Rousillon is the finest, that of Narbonne is nearly as fine, but more cottony, and of a shorter staple. The wool of Beziers is next in quality; that of Pesenac, in Languedoc, on the side of Montagnac, is somewhat less fine. The wool of the sea-coast is heavy and coarse: the wools of the mountains of Montpellier and De Somieres are of three sorts; the first equal to the wool of Pesenac, the second less fine, the third very coarse. The wool of Berry is fine; that of Rheims inferior. The number of sheep in France is estimated at 30,307,728: the total of the wool they yield may be rated at 106,770,000 lbs.

There are a vast number of goats in France, principally, of course, in the mountainous districts. Pigs are chiefly fed in the neighborhood of woods, or where grain abounds, as Normandy, Champagne, Limosin, &c. They are also fed on acorns; and, in the Limosin, on chestnuts.

Immense quantities of poultry are kept in all parts of France; to such an extent, indeed, that it is a question whether there is more weight of mutton consumed, or of poultry. They are of an excellent quality. Great pains are taken in rearing and fattening them. In French Flanders, as well as in other districts, they are fed with the flour of buckwheat, or rye, or potatoes: their food is frequently changed; and the vessel into which their meat is put is washed with hot water after every repast. After feeding, they are kept in darkness till the next meal. In some parts, what are called *vermiculaires* are expressly kept for them; that is, places in which worms for their food are collected and preserved. Capons are fattened in many parts of the kingdom: those which are fattened at Barbezicou, a town in the department of the Charente, are so much esteemed, that they are sent to Paris for those who keep the most delicate tables.

Narbonne honey is much celebrated, but it is not the produce of the neighborhood of that place; at least it is seldom to be procured there: what is so called is more commonly, as well as much more abundantly, procured at Perpignan. The beeswax of Champagne, Normandy, Sologne, Languedoc, Auvergne, and Brittany, is esteemed the best. Bleaching wax is a business of importance in France. The yellow wax of Brittany bleaches with the most ease, and becomes a beautiful white: it is principally bleached at Chateau Goutier, about eight leagues from Angers. By some, this is esteemed the very best in the kingdom; by others, that of Champagne is preferred. The wax of Amboise, and of Chaumont near Troyes, is of an inferior quality; and that made at Rouen is esteemed the worst, on account of the large quantity of suet they add to it. At Montpellier, there is a large manufacture of beeswax, and the process is conducted with great attention and skill.

The forests of France are numerous and extensive; and as they have also been of great importance, both on account of the fuel they supply, and of their application to other purposes, many calculations and conjectures have been made with respect to the surface which they cover. The Marquis de Mirabeau represents them as 30,000,-

000 arpents; in this opinion M. Malpart coincides. By the author of the *Credit National*, they are reckoned so low as 6,000,000 arpents. Mr. Young endeavors to determine this fact by two methods; by the maps of Cassini and by the consumption of the people. By the first method, he makes the extent of wood about 19,000,000 arpents, or one-seventh of the kingdom; by the other method, he finds, that the quantity of wood is about 20,800,000 arpents; the mean of the two results which he thus obtains is 19,850,515. We have already observed, however, that his estimate is too high, at least it is above that of the committee of the first national assembly, which reckons the wood only at 13,100,691 arpents. Mr. Young, in his calculation, reckons the annual value of the woods to be about 12 millions sterling, the rent being taken at 12s. per acre.

Some of the forests are very extensive, particularly those of Orleans, the Ardennes, and Fontainebleau. The forest of Orleans lies to the north of that city, and of the river Loire; it contains several plains and villages in it; its whole length is upwards of 15 leagues; but it is of unequal breadth, in some places seven or eight leagues, in others only two or three. It contains great variety of timber, such as oak, elm, aspens, fir, &c. Before the revolution the value of the timber annually felled in this forest amounted to 100,000 livres: the profit was part of the appanage of the Duke of Orleans. It was formerly infested by numerous troops of banditti; and it is still the haunt of immense numbers of wolves. The forest of Ardennes, in the time of Cæsar, was the largest in Gaul; it began on the banks of the Rhine, and extended to the very borders of the Rhone, that is to say, the diocese of Rheims in Champagne. In another place he says, it extended from the banks of the Rhine, and the country of Treves, to that of the Nevii, that is Hainault, Cambresis, and French Flanders, comprehending 50,000 paces in length. This forest has been cut down in a great many places, especially towards its extremities: however, it still extends over the greater part of the Duchy of Luxembourg, in the southern part of the bishopric of Leige, and of the province of Hainault, and of the northern part of Champagne, though with several interruptions. It was formerly renowned for events of chivalry. The forest of Fontainebleau, anciently called the forest of Biere, contains 26,424 acres of ground, reckoning many empty places, where the trees have been cut down.

(To be continued.)

ESSAY ON THE NATURE AND IMPORTANCE OF AGRICULTURAL EDUCATION.

By Professor G. D. Armstrong, of Washington College, Va. To which the prize was awarded by the Bedford Agricultural Society.

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In this country, we use the phrase "agricultural education" with some variety of meaning. Very frequently, we apply it to the whole of that education which the farmer ought to receive; at other times, we use it in a more restricted sense, as including only that education which the farmer

should receive for the especial purpose of preparing him for his business as a farmer, and not that which it is proper he should possess in common with men of all other professions. The latter is the more appropriate sense of the phrase, and is doubtless the sense in which the society intended it should be understood, and for these reasons I shall so understand it in the present essay. In taking such a course, I would by no means be understood as attaching but little value to that general education which the farmer should possess in common with others. In such a country as this, where the will of the people is the fountain of all power, it is of the greatest importance that all our citizens should be well informed respecting every subject on which they are called to act; and the more extensive and thorough this information is, the better will it be for them individually, and for our country too, "the common mother of us all." There is no remark more true, than that made by one of the fathers of our revolution, that the "permanence of our free institutions must depend, under Heaven, upon the intelligence and virtue of our people." But the discussion of such a topic, however appropriate it might be on another occasion, was, I suppose, intentionally excluded when agricultural education was proposed as the subject, and on this account I shall pass it by.

By agricultural education, I understand (as before remarked) that species of education, which the farmer should receive to prepare him for his business as a farmer; or, in other words, education in those departments of human knowledge which have an immediate and practical bearing upon the business of agriculture. In order to determine what studies would properly be embraced in such a course of instruction, we must look for a moment at the situation of the farmer. In this country, his situation is somewhat different from that which it is in most European countries, in those countries the land is generally owned by one class of men, whilst it is cultivated by another;—in this country, on the contrary, the land is generally owned and cultivated by the same person; so that in discussing this subject, with reference to our own condition, we must consider the farmer, both in the character of an owner, and in that of a cultivator of the soil.

The business of agriculture, when properly conducted, is one of a very complicated character. In no department of human labor, is attention directed to a greater variety of subjects, or subjects which it is more difficult fully to understand. The difficulties which attend the profitable prosecution of agriculture, are owing to such causes as these: differences in the constitution of soils; difference in the nature of plants considered with reference to the soil; the changeable character of plants themselves, improving as they do under one system of culture, and deteriorating under another; differences in the manner in which the produce of the soil may be prepared for market; differences in the manner in which the available force of the farm may be applied to the accomplishment of all necessary work. All these things, and many others of a similar character, are to be so attended to, and so conducted, that the greatest amount of net income shall be obtained, with most certainty, least labor and least detriment to the soil. Such is the problem which the farmer has to solve; and no one can examine the several particulars

embraced in it, and not be convinced that its solution is a matter of no common difficulty; or doubt that there is here a field opened, in which the best powers of the human mind, and the greatest amount of information which can possibly be brought to bear upon the subject, may most properly and most profitably be employed.

But to leave these general considerations, and to descend to particulars. What departments of human knowledge are there, which admit of an immediate and practical application to the business of the farmer? Answering this question, the first which claims attention is *chemistry*, or that branch of physical science which investigates the composition and intimate nature of bodies. This claims attention first on account of the manner as well as of the variety of the applications of which it admits.

It is certain that there are great differences among soils, in their adaptation to agricultural purposes. In one soil, it is necessary only to bury the seed, and almost without attention, it springs up, and in due season yields an abundant harvest; whilst in another, it is with the utmost difficulty we can obtain even a scanty return for our labors. There are great differences among soils, in their fitness for the cultivation of different crops. A soil which will yield an abundant harvest when cultivated in one crop, will not repay the expense of planting in another.—That these differences arise almost entirely from differences in the composition of soils, I suppose, no one doubts. A soil may be rendered unfit for the cultivation of a certain crop, either by a deficiency in some element necessary for its growth, or by containing some element which is positively injurious. In order that a farmer may go to work intelligently to remove the difficulty thus presented, he must first know whether the evil in question consists in the presence of some noxious substance, or in the absence of some necessary one; and then he must determine the precise nature of the substance to be removed or supplied. This he can seldom or never do, by mere inspection, for the simple reason, that the elements of soils are so intimately intermixed that it is impossible to distinguish them by the senses.

But let us suppose that the nature of the evil is known and that it consists in the presence of some noxious substance; is he then any better off? It is in vain to think of any mechanical means for its removal, for so intimately is it intermixed with the other constituents of the soil, that a resort to any such means must result in entire failure. In such circumstances a knowledge of chemical principles may be of the highest value, since from them, and from them alone can we learn, how the evil is to be removed. In Davy's *Agricultural Chemistry*, there is an instance mentioned, which will fully illustrate this point. "A soil of good apparent texture, from Lincolnshire, was put into my hands by Sir Joseph Banks, as remarkable for sterility. On examining it, I found that it contained sulphate of the oxide of iron, and I offered the obvious remedy of a top-dressing with lime, which converts the sulphate into a manure." In this case there are several things worthy of remark. 1st, the soil was, to all appearance, a good one, the cause of all its sterility being so intimately intermixed with the other constituents of the soil, as to be perfectly undistinguishable by the senses.

2nd, the sulphate of the oxide of iron was a substance of such a nature, and existed in such a form, as to render it altogether impossible to remove it by any other than chemical means;—as it was so intimately intermixed with the other elements of the soil as to be undistinguishable by the eye, any attempt to pick it out, would be entirely out of the question. 3d, by the application of chemical principles, Davy was enabled not only to detect the nature of the evil, but to convert it into a positive benefit. By the action of the lime spread upon the land, the sulphate of the oxide of iron was decomposed; the oxide of iron, a perfectly inert substance so far as vegetation was concerned, being left in the soil, whilst the sulphuric acid combined with the lime, thus forming sulphate of lime or plaster, a most excellent manure. 4th, the means by which Davy arrived at a knowledge of the nature of the evil, and the remedy to be applied, were exceedingly simple. It is true that these means are not mentioned in his accounts of the case; but all that was necessary, was to take a small portion of the soil, and having placed it in a glass, to pour some water over it, and then, after it had stood for a few minutes, to add a few drops of an infusion of nut-galls. When thus treated, the sulphate of the oxide of iron would discover itself, by the deep black color which it would give to the liquid. In such a case as this, the advantages resulting from a knowledge of chemistry must be apparent to every one.

In most instances, sterility arises from the absence of some one or more of the elements of a good soil, and it is to the interest of the farmer, by the application of a proper manure, to supply this deficiency. That it is not always the same element which is absent, is evident from the fact, that a manure which will prove very beneficial to one portion of land, will be entirely useless, and even in some instances, positively detrimental to another. Putrescent vegetable matter and common salt are two of the manures in common use in England. Some soils are unproductive for the very reason that they contain too much vegetable matter, and others are so because they contain too much salt. To apply vegetable matter to the first, or salt to the last, would be worse than useless; and yet it does not admit of question, that in most cases, each of these substances is a manure of great value. But I suppose that it is not necessary to urge the matter further. Every farmer knows, that there is no one manure which will act well on every kind of soil; and every one, I presume, will admit, that this difference arises almost entirely from differences in the composition of soils. If this be admitted, then the conclusion necessarily follows, that to apply manure to advantage to any soil, we must first know the particular nature of that soil; and this can be ascertained in no other way so well as by chemical analysis.

The most common objection which is made, when the claims of chemistry upon the practical agriculturist are urged, is based upon the complexity of chemical operations, and the difficulty of performing chemical analysis. In answer to this, I will say, that whilst it must be admitted that the accurate analysis of soils and minerals is a work of great difficulty, and such as none but the accomplished chemist, with a well furnished laboratory at command, can hope to perform, yet the difficulty is an imaginary and not a real one, as

far as the matter in hand is concerned. These accurate chemical analyses are seldom wanted for agricultural purposes; whilst such rough analyses as are needed, can be performed with but little labour, and but little apparatus. The remarks of Sir H. Davy on this point are:—"There is no idea more unfounded than that a great devotion of time, and a minute knowledge of general chemistry are necessary for pursuing experiments on the nature of soils, and the properties of manures. Nothing can be more easy than to discover whether a soil effervesces, or changes color by the action of an acid, or whether it burns when heated, or what weight it loses by heat; and yet these simple indications may be of great importance in a system of cultivation. The expense connected with chemical inquiries is extremely trifling; a small closet is sufficient for containing all the materials required. The most important experiments may be made by means of a small portable apparatus;—a few phials containing acids, alkalies, and chemical reagents; a lamp, a crucible, some filtering paper, some funnels and glasses for receiving products, are all that can be considered as absolutely essential for pursuing useful researches." The opinion of a man, who, like Davy, devoted his life to chemical studies, and no small portion of it to agricultural chemistry, and who of course was competent to express an opinion, should be received as decisive respecting this matter.

Intimately connected with chemistry, and bearing upon the same point, viz. the elucidation of the nature of soils, are the two intimately connected sciences of *mineralogy* and *geology*. Besides their direct application to agriculture, in this way, any one who will call to mind the large number of mineral substances which are useful to man, in almost all the various arts of life, must at once see the value of a knowledge of these sciences to the farmer, considered in the character of the owner of the soil. In speaking of the great value of mineral substances, it will be sufficient to mention, the various metallic ores; siliceous, used in the manufacture of glass; the different clays, used as pigments and in the manufacture of porcelain, earthenware and bricks; hydraulic and common limestone used in the preparation of cements, and the latter, so extensively and with such evident benefit applied as a manure; marble, and sulphate of lime, or plaster, salt and coal, the uses of which are familiar to every one. These constitute what is very properly termed the "mineral wealth" of a country, and have been scattered in such profusion by the hand of a bounteous Creator that no large portion of land can be found in any country, in which some of them do not exist. It is a fact, perhaps not generally known, that almost all minerals are definite compounds; that is, contain fixed and invariable portions of the elements of which they are composed; and that the different species of minerals can be distinguished from each other, by characteristics obvious at once to the senses, or else by such simple chemical tests as every one may command; so that to a person familiar with these characteristics, chemical analysis is very seldom requisite, to determine their exact composition. It is the object of the mineralogist to ascertain the obvious characteristics of each species of mineral, so that by a very simple examination, he may be enabled to recognize it.

Every year there is a great deal of labor fruitlessly expended, and a great deal of money thrown away, in different parts of our country, to which even a slight knowledge of mineralogy would give such a direction, as to make it profitable, instead of being, as it is, a complete loss to the community. I am acquainted with a case in which a copper mine was sold some years since for 60,000 dollars, and now the purchasers are prosecuting the sellers, on the ground of a fraud in the sale, the fraud alleged consisting in their having represented the mine as a valuable one, when in fact it was utterly worthless. From a personal examination of this mine, made at the request of a person who thought of becoming interested in it, I will venture to assert, that with a slight knowledge of mineralogy, all this waste of time and money, and character too, might have been saved. I am acquainted with a case in which, at this present time, a person is industriously engaged indigging up what he believes to be plaster, when by the simplest process in the world, he might be satisfied that there is not a particle of plaster in it. I know of an instance in which a gentleman expended a large part of his fortune, in making extensive preparations for working what he supposed to be a gold mine, when, in fact, it was nothing but sulphuret of iron or martial pyrites; and so simple an operation as heating a small fragment of it in the flame of a candle, would at once have made him aware of his mistake. In the first settlement of Virginia, a mistake respecting this same substance, by turning the attention of the colonists from their proper business, that of agriculture, caused great loss and great suffering to this then infant colony. But it is needless to multiply instances of this character. It is sufficient to refer to the great mineral riches which lie hidden in almost every part of our country; and to mention, that it is the object of mineralogy to enable us at once to recognize them by characteristics obvious to the senses, to show the value of such information to the possessor of the soil, and the propriety of including it in a course of agricultural education.

A third branch of natural science, which may very properly form a part of a course of agricultural education, is *botany*, including under this general name, both *systematic botany* and *vegetable physiology*. The object of *systematic botany* is, so to arrange and so to describe plants, we can at once determine with certainty both their names and their most important properties. In proposing such a study as this, I may be met with the question, why cannot the common names (as they are called) of plants be used by scientific writers, and thus the necessity for such a study be removed? There are several weighty reasons why such a course cannot be adopted. One is, that by far the greater part of the plants of every country have no common names; and even in the case of those which have, those names are entirely unknown to the greater part of the people. Another objection is, that the common names of plants are not uniform throughout the country; in many instances the same plant being called by different names, and what is still worse, different plants being called by the same name. To illustrate this objection, I will mention a single instance. In the "Details of experiments on Grasses," given in the appendix to Davy's *Agricultural Chemistry*,

there is a great amount of most valuable information respecting the comparative value of the different grasses; amongst others the *Phleum pratense* is mentioned, and the common name which it bears in England given, viz: Meadow cat's-tail grass. The only grass called cat's-tail grass in this country is a coarse grass, utterly worthless as food for cattle, and as different from the grass intended in the paper referred to as any two grasses can be. The *Phleum pratense* is the grass called timothy in some parts of the country, and herds-grass in others; for it is a fact of which all may not be aware, that the names timothy and herds-grass are applied interchangeably, in different parts of this country, to two very different grasses; that which is called timothy in one part, being called herds-grass in another, and that which is called herds-grass in the former is called timothy in the latter. In this case, dependence on the common name would necessarily have led the reader into error. In this paper the scientific names are given; but without a knowledge of systematic botany, it must remain a sealed book to any reader; and yet from a mere inspection of it any one can see that it contains the very kind of information respecting grasses which the farmer most needs. Should writers on agricultural subjects make use of common names, in very many instances their communications will be of no value out of the immediate section of country in which they reside; should they use the scientific names, it must be confessed, that at present the case would not be much better; but then the difficulty which here presents itself, is one which can be easily removed. Let farmers become familiar with these scientific names, and they then are in possession of the common language used by writers among every civilized people on earth.

The object of *vegetable physiology* is to explain the structure and vital action of plants. Plants may be regarded as a class of curious machines, by which the common elements of nature are worked up into organized forms, and thus fitted for the sustenance of human life. The object of vegetable physiology is to lay open their structure for inspection, and to explain their manner of operation. If plants were susceptible of no changes—did they remain the same, and thrive equally well in all climates, in all soils and under every system of cultivation—a full understanding of their structure and manner of growth would be of no practical value to the farmer. He would then receive a certain return for his labor and that return would be the same whatever course he might pursue. But such is not the fact. To be satisfied that great changes, and changes too which materially affect their value may be produced in plants, by careful cultivation, nothing more is necessary than to compare any four fine large species of apple, with the wild crab, the stock from which it originally sprang. Indeed, some of the plants in common cultivation have been so completely metamorphosed, have been so much improved by long continued and judicious culture, that it is impossible to tell with certainty what they originally were. That every plant will improve under a judicious system of culture, and deteriorate under an injudicious one, the fields of the thrifty and of the unthrifty farmer in every part of the country abundantly testify. Then, too, plants are subject to diseases, arising from the influence of

the atmosphere, from the stings of insects and from many other causes. We all admit the importance of a knowledge of the anatomy and physiology of the human body to the physician; may we not fairly conclude, from analogy, that a similar knowledge, respecting plants, would be of service to the farmer?

Although plants are subject to many changes, from the influence of soils, climates, and the arts of men, yet these changes always take place in accordance with certain fixed and invariable laws. The object of the Vegetable Physiologist is, by careful observation and oft-repeated experiments, to learn these laws, in order that acting in accordance with them, man may render the vegetable kingdom subject to his control. Lord Bacon has remarked that "knowledge is power." This is true in a peculiar manner of natural science, for it is only by acting in accordance with the laws of nature, that we can render it subservient to our will.

It may seem strange, but it is no more strange than true, that many of the commonly received opinions respecting the growth of plants, are directly at variance with truth; and as a matter of course, the practices based upon those opinions, are any thing else than the proper ones. To mention a single instance. It is the common belief that the sap circulates through the trunks of trees during the spring and summer, whilst it retires into the root during the winter; and as the dry-rot is believed to arise from the presence of sap in timber, the common practice is, to cut timber which it is desired shall last long in mid-winter. This opinion respecting the situation of the sap at different seasons of the year is altogether erroneous, as any one may convince himself by the following simple experiment. Let a young oak sapling be cut in the winter, and laid upon the fire. As soon as it becomes thoroughly heated, the steam will rush out at each end of the stick, from the heart wood, whilst the sap-wood will remain dry; let a similar stick be cut in the summer and treated in the same manner, the steam will then be found to issue from the sap-wood, whilst the heart-wood will remain dry; thus showing, that during the winter months, the heart-wood is the principal depository of the sap, whilst during the summer months, it circulates almost exclusively through the sap-wood. The common opinion, that the presence of sap is the immediate cause of the dry-rot in timber, is doubtless a correct one; but the very correctness of this opinion leads to an error in practice, when coupled with an incorrect opinion respecting the situation of the sap. The proper practice would be, to cut timber during the summer, and not during the winter months.

A fourth department of natural science, which may very properly be included in a course of agricultural education, is *mechanical philosophy*, embracing the laws of force and motion, as they apply in the case of solids, liquids, and gases. Mechanical philosophy has been defined as "that science which teaches us how to produce the greatest effect with the smallest expense of power." The principles of mechanics are involved in the construction of ploughs, wagons, thrashing machines, and in fact in all the implements of husbandry; and it is impossible that any one should fully understand the structure of these instruments, the

excellencies or defects of those now in use, or be able to decide intelligently upon the claims of new inventions, without a knowledge of these principles. Besides their useful applications in the business of agriculture, a knowledge of the principles of mechanics will be found of service in many of the operations of rural economy. I will mention an instance which occurred within my own knowledge. A farmer purchased a beef, agreeing to pay a certain price per pound net weight. Being unexpectedly called from home, he directed that during his absence, the beef should be killed, cut up, its weight ascertained, and that then it should be salted. When he returned, he found, on adding up the weight of the several quarters, that some mistake must have been made, as the sum was much more than it was possible the beef could weigh. On inquiring into the matter, he discovered that the weight belonging to one pair of steelyards had been used with another pair; the steelyards used being made for a 7lbs. weight, whilst the weight used was one of 5lbs. It was impossible to reweigh the beef, as it had been cut up, and packed away; so that the only alternative left him, was either to pay for beef which he had not received, or else to correct the error by calculation. The person in question was familiar with the mechanical principles of the lever, and by applying them to the case before him, easily ascertained the true weight of the beef. The condition of equilibrium in the case of the lever, is, that the weight multiplied into its distance from the fulcrum, shall equal the power multiplied into its distance from the fulcrum. From a consideration of this principle it will be seen, that the true weight was five-sevenths of the weight given by the 5 lbs. weight.

Another case, illustrating this same point, has come to my knowledge within a few months. A farmer undertook to have a forcing pump constructed, to raise water from a spring in a valley to his house, situated on a hill; the pump to be worked by water power. When every thing was completed, on attempting to make the pump work, he found that his power was insufficient. To remedy this evil, he had the whole taken to pieces, and every thing constructed anew and on a smaller scale, excepting the water power machinery. Had he been familiar with the principles of hydrostatics, he would have known that the same object might have been accomplished by simply replacing the piston of his pump, and of course the part of the log in which it worked, with one of smaller dimensions; whilst the remaining 200 feet of pipe (for there was about that length of pipe between the pump and his house) might have remained the same, and in fact, the larger pipe would have answered better than the smaller one with which it was replaced, since the friction of the moving column of water would have been diminished by the interposition of a stratum of fluid between it and the sides of the pipe. Precisely such cases as these may not occur to a farmer in the whole course of his life, but unless his life be very different from that of most men, many cases will occur, in which a knowledge of mechanics will be equally useful; and on this account he should, if possible, render himself familiar with those principles.

A fifth study, which should be embraced in a course of agricultural education, is that of the

more simple *mathematics*, including *arithmetic*, *algebra*, *geometry*, *trigonometry* and *surveying*.—One reason why these should be studied, is, that without a knowledge of them, it is impossible to pursue the study of mechanical philosophy or chemistry with any pleasure or to much advantage. Another, and the principal reason is, that they admit of an immediate and practical application to the business of agriculture. And here let me mention in particular, a thorough knowledge of the theory and use of numbers. If a farmer would know how his business is progressing, he must keep accounts and make many calculations. The following remarks of Mr. Hawkins, published in the British Quarterly Journal of Agriculture, and copied into the Farmers' Register for Oct. 1824, place this matter in its proper light: "In a business embracing so many particulars as agriculture, it is essential to be able to distinguish the profit and loss upon each. Nothing is more easy or more common, than for a man who keeps no accounts, to continue for a series of years to lose money on some particular department without knowing it; or, which is almost as bad, to employ his time and capital in less profitable speculations, when he might have applied them to such as were more so. A farmer grows many kinds of crops and keeps several species of animals—breeding some and buying others—and uses many kinds of manure. Assuming that he has a general profit of 10 per cent. at the end of the year, how is he to tell whether all the branches of his business have contributed rateably to this result, unless he keeps accounts? The cost of one acre of corn, for example, is compounded of rent, tithes, taxes, the cost of seed and tillage, horses' keep and man's keep, rates for the poor, the church and the highways;—and so with every other crop. Suppose now that in the case of his corn crop, all the items of expenditure accurately set down shall amount to £5 15s. per acre, and that the crop shall sell for £5 10s. Upon 40 acres, here would be a loss of £10 a year; but without setting down the several items which compose the cost, and adding them together, how is a man to tell within 5s. how much his acre of corn cost him? He may know that it cost him about £5 or £6, but in this very *about*, lies the essence of the mischief. If the selling price were £5 10s. the former supposition would give a profit and the latter a loss of £20 a year;—and thus any man may, and many men do, continue to the end of their lives, carrying on branches of business by which they lose money unconsciously. It is by a few shillings per acre, gained here and saved there, that a farmer makes his profits. It is no exaggerated estimate to suppose that these petty items may often make a difference of 10 per cent. at the year's end; and that so one man may make a living on the same farm where another would fail." These remarks will not apply in all their minutiae, to the business of agriculture in this country; but in their general principles, they apply alike to the agriculture of every country; and they set before us, in its true light, the importance of a familiar acquaintance with figures, to the farmer. Many other illustrations might be given, but it is deemed unnecessary; for it is not by the endless multiplication of instances that the attention can be arrested or conviction produced, but by a few well-selected cases, which may properly be taken as illustrations of the whole.

Besides the studies already mentioned it would be desirable for the farmer to acquire, if possible, some knowledge of entomology, physics, meteorology and comparative anatomy. These studies are, it is true, comparatively unimportant; and yet a few remarks on their nature may not be inappropriate in this essay. Entomology is that science which treats of the structure and habits of insects. The farmer often suffers great injury from the depredations of insects, and no certain way of protecting himself against them can be discovered (unless it be by accident) without first becoming acquainted with their nature and habits. The mistakes to which persons are liable, from the want of such information, are well illustrated in the following extract from a treatise on entomology by Messrs. Kirby and Spence. "In Germany, the gardeners and country people, with great industry, gather whole baskets-full of destructive cabbage-moth, and then bury them, which is just as wise a course as to attempt to kill a crab by covering it with water; for many of them being fully grown, and ready to pass into their next state, which they do under the ground, instead of destroying them by this manœuvre, their appearance again the following year in greater numbers is actually facilitated. Yet this plan, if applied to our common cabbage-caterpillar, which does not go under ground, would succeed." Physics, in its restricted sense, (and it is in that sense that I here use it,) embraces an inquiry into the nature of light, heat, electricity and magnetism. An acquaintance with the laws which govern these ever-active and every-where present agents, might prove serviceable to the farmer in many cases; as, in the construction of ice-houses, fire-places, lightning-rods, the selection and preparation of clothing materials, &c. The object of meteorology is to inquire into the nature of the atmosphere, and of those phenomena which occur in the atmosphere, or are caused by it, such as the formation of clouds, the production of rain, hail and snow, the deposition of dew and frost, the cause of winds, &c. The object of comparative anatomy is to explain the structure of animals; more particularly the forms of their different bones, the manner in which those bones are connected, the position and attachment of the muscles, &c. A knowledge of the structure of what are termed domestic animals, would, in all probability, admit of some valuable applications in the hands of practical men.

Whilst thus advocating the claims of science, I would by no means be understood as advancing the opinion, that a scientific education alone would fit a man for the profitable prosecution of agriculture; for this is an opinion which I do not entertain. I would make the farmer's scientific education, like education of every other kind, preparatory to a course of practical training to be received from some farmer competent to the task. Sir H. Davy's remark respecting agricultural chemistry, is a very just one, and might be made with equal truth of every other science: "It has been said, and undoubtedly with great truth, that a philosophical chemist would most probably make a very unprofitable business of farming; and this certainly would be the case, if he were a mere philosophical chemist, and unless he was acquainted with the practice of the art as well as its theory. But there is reason to believe that he would be a

more successful agriculturist, than one equally initiated in farming, but ignorant of chemistry; his science, so far as it went, would be useful to him." The case of Lavoisier, one of the most celebrated of European chemists affords an example of the advantages which may be derived from the application of science to agriculture. By following a system of cultivation, based upon his knowledge of natural science, he is said, "in the course of nine years, to have doubled the quantity of grain produced on his farm, and to have quintupled the number of his flocks." With such an example before us, we cannot reasonably call in question the value of scientific knowledge to the farmer; but at the same time, let me remark, that should we suppose that scientific knowledge was all that was needed, we should fall into an error equally great. There are a thousand important considerations connected with farming, of which science does not and cannot take cognizance, and which can be learned from the practical farmer alone. If little has been said in the present essay, respecting the importance of such knowledge, it has not been because the author undervalued it, but because he supposed it was not properly embraced under the term education, as that term is generally understood in this country, and at this day.

Such are the principal studies which should be embraced in a course of agricultural education. It will be noticed that they are all of a scientific character; and here a remark or two respecting the nature of science may not be misplaced, with especial reference to the objection commonly made against it, based upon the belief that scientific knowledge is something essentially different from human knowledge in general. By science, when properly understood, nothing more nor less is meant than our knowledge arranged and generalized. Our knowledge on all subjects is in the first instance a knowledge of individual facts. After a stock of facts has accumulated, we perceive that many of them are of the same character; these we class together, and include them under a general statement. Again, we observe that some of these facts bear to others the relation of cause to effect, and we arrange them in accordance with this observation. This once accomplished, our knowledge has become science. By this process, the form and not the nature of our knowledge is changed. Founded, as scientific principles are, upon observation, their application to the affairs of life is one of the very best methods of testing their truth. If they will not stand this test, they form no part of true science, but of "science falsely so called."

The greatest objection in the minds of most persons to the scientific education of farmers, is that it will make them mere theorists. But will ignorance of science prevent their theorizing? The remarks of Hawkins in a communication already referred to, are; "Ignorant men are the most irreclaimable theorists. They attribute effects to the most fanciful causes, and then from their assumed and absurd premises, they argue away as boldly as a geometer. I have heard many striking instances of this from a friend of mine, who is both a physician and a philosopher. One instance was as follows. A poor fellow was troubled with what he considered 'a rising of the lights;'—and when I asked him, if he had taken

any thing for it, replied, that "he had swallowed a few shot to keep them down." The position assumed by Mr. Hawkins in the above extract, that "ignorant men are the most irreclaimable theorists," may perhaps seem to some a very bold position; and yet I will venture to assert that a careful observation of the facts of the case will fully confirm its correctness—at any rate, such is the result of my observation. The truth is, the human mind is so constituted, that it is impossible for a person to become acquainted with any large number of facts, and not reason upon them, and form some theory respecting them; and, if ignorant of any of the data on which such reasoning should be based, or of the correct principles of theorizing, he will almost inevitably run into error. An acquaintance with true science, so far from leading a man into a course of unprofitable theorizing, would be the very best means of preserving him from such a course.

Such a scientific course as that which has been proposed, would require for its completion, in the case of a young man already familiar with the ordinary branches of an English education, about two years; or, with very close application, perhaps a somewhat shorter period might suffice. The study of the sciences should be commenced in youth; for few men can be brought to give that close attention which is necessary for the successful prosecution of such studies, after their proper school-days are over. But "in the morning of our days, when the senses are unworn and tender, and the gloss of novelty is fresh on all the objects which surround us;" when the memory is susceptible of its most lasting impressions, and the curiosity is all life; a taste for such studies can be planted, and those habits of minute and careful observation, so essential in scientific pursuits, can be formed. At this period the father must in all cases think and act for his son. Does he desire to leave him beyond the reach of poverty and want? It should be a question for serious consideration, whether he can best secure this end, by adding a few hundred dollars to his patrimony, or by expending that money in giving him an education, which will fit him fully for his intended business, and which will be to him a source of pleasure, as well as profit, to the end of his days.

At this time it is generally admitted, that the agriculture of Virginia needs a change for the better. That it is not what it should be; we need no other evidence than that afforded by the fact, that many of our most valuable, most enterprising young men, are leaving the land of their fathers, to seek a home, and perhaps many of them a grave, in the far distant regions of the west and southwest.—Within a short time, a spirit of improvement has sprung up, which seems to be gaining strength, and extending its influence year by year. What is now needed is something to give to this spirit a right direction; and this is the very thing which agricultural education will accomplish, if it accomplish any thing. If this can be done, we may confidently indulge the hope that Virginia will yet recover her proud pre-eminence among her sister states; that her now half-deserted districts will again be filled with a contented population; that her most impoverished soils will be restored to more than their ancient fertility, and will again wave with the golden harvest; that her sons, instead of turning their footsteps to some distant land, will remain at home,

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and, proud of their birth-place, will close their days "within sight of the very spot where they were born."

ON THE DIFFERENT PROPOSED SCHEMES OF ROTATIONS.

To the Editor of the Farmers' Register.

Carysbrook, May 12th, 1840.

One of those lucky mischances which sometimes occur to the way-faring man has brought me to-day, *volens volens*, to this place: a place which has been rendered not quite so noted in your journal by the essays of its worthy proprietor, as was Carysbrook of England by the temporary occupancy of the unfortunate Charles, who, if I remember aright, took refuge there from the pursuit of the commonwealth's men. How are the apparent errors of short-sighted mortals turned to good account by a kind Providence! I deplored missing my way as a great evil; but what a treat was in store for me, in the sight of this interesting spot! Still more I lamented my fate when I found the landlord was from home! But you and your readers are the gainers by my ill luck, inasmuch as it has produced this *valuable* communication. Nor is it a total loss with me; for the absence of the host has been the means of bringing out in finer relief the shining merit of his representative, a personage bearing the name of the immortal author of the Declaration of Independence, who in his sphere, (the department of butler,) is no less perfect than was his great namesake in the cabinet; and to whom, if Pope said true, equal honor is due:

"Act well your part, there *all* the honor lies."

Casting my eye around the hall in which I now sit, where are to be seen the appliances of hunting and fishing, it fell upon some of the numbers of your Register, which, among other appropriate periodicals, are scattered in careless literary confusion about the room. In the March number I found an essay on "the five-field rotation and grazing;" this referred to other communications on the same subject in the February number.

Now, Mr. Editor, my success in the discussion of Jefferson's eatables, has not inspired me with the vanity to pretend to discuss farming matters with these gentlemen. It is true I am a sort of a farmer in an humble way. Having failed at one of the *learned* professions, I betook myself to my present occupation, as a make-shift, hoping that if I failed here too, my errors would be more apt to escape observation.

The first thing that struck my attention in the above mentioned essays was the remarkably civil, complimentary style of your tip-top farmers to each other. I like it much. It is so different from that gasconading, insulting mode of writing practised by politicians; and not in writing only, but in debating too. I trust the new code of honor which authorizes one man to give another the lie, or charge him with dishonesty, and then to avoid responsibility by averring that he means a political lie, or political dishonesty, will never find acceptance among the agricultural community. Among us, let there be no nice distinction between an agricultural lie and any other.

But to the point. With all due deference, permit me to state an objection to each of the systems of rotation proposed. To Mr. Carter's, because it seems to be bottomed upon the presumption that the land has become too rich already, and requires depletion, an effect which, it strikes me, the three successive grain crops are well calculated to promote. To Mr. Braxton's, because it leaves the land naked and perfectly idle through one winter, and of course losing ground. I have always thought a spring crop after corn inadmissible for that reason. Besides that, grass sown on oats in the spring of the year is extremely liable to perish under the influence of the summer's sun. To Rivanna's, because without the common, or sixth field, it differs but little from the exploded three-field, or make-shift system. It is true he considers this common *important* to all rotations; but to him it seems indispensable, for where else are your cattle to find sustenance till the 20th June, the day set for the feast? Before that day comes they will have feasted the buzzards. And even with the aid of the common, or "short-bite," (by the way, if it is a "short-bite" in the Green Spring country, what can be expected from a common in "old Flu," or some other places I could name?) they would exhibit in their "unfed sides" demonstration strong against the system; they would sing, in very doleful tones indeed, the old song,

"'Twas on the 21st of June,

In charming summer weather."

Give the three-field shift the advantage of a common, and where is the difference? No other than one field of clover instead of two, covering a somewhat smaller portion of your farm, one-third being less than two-fifths. I am of Mr. C's opinion, that under Rivanna's system the clover has not imparted to the land all its benefit, before it is refallowed. It ought to be an object in a judicious and economical course of husbandry to obtain hay and seed from a clover crop, or at least a part of it. If then one of the two fields is mowed and seed gathered from it, it cannot be grazed at all the same year. Only one field therefore is left for grazing, and that between the 20th June and fallowing time—a very "short-bite" indeed. It appears to me there should be two clover years in succession—cutting the first if the crop will bear the scythe, and grazing the second—and two grain years only in succession, which is a four-field course; and if I am allowed the common in the bargain, this is a valuable auxiliary, to enable the pasture field to get a little ahead in the spring, before the stock is put on.

The long and short of the matter is, that systems for all things must be controlled by circumstances. A system of mental improvement must be adapted to the capacity of the particular mind, so must be a system of agriculture to the qualities of the soil, general condition, and localities of the particular farm. Rivanna, for example, or the author, enjoys the advantage of a very fine meadow, and abundant crops of corn, with a plenty of wheat straw, &c. which afford no small help to the "short-bite." By the way, in passing through the front gate, I observed some horses standing with their chins resting on the fence, looking with longing eyes into the adjoining clover field, and seeming to pray for the advent of the 20th June; and some hogs peering, with optics sharp, through the rails.

In conclusion of these very *erudite* remarks, permit me to say that the present condition of this splendid farm furnishes a refutation of all objection to the management of it. The science of agriculture is here beautifully illustrated, whilst its profits are largely realized.

"A TRAVELLER."

HOT AIR FURNACES.

From the Cultivator.

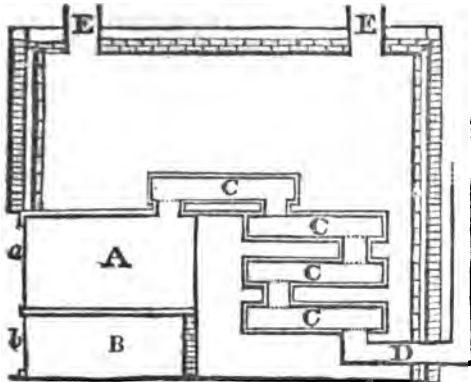
I have repeatedly been asked for information respecting hot air furnaces, and as summer is the time for their erection, perhaps a short description will not be unacceptable.

Permit me to speak very briefly of their advantages, alluding of course to the mode of construction here described. Fuel is a large item of expense in every family, and is becoming still more so. We know many farmers who annually consume, in warming the different rooms of their houses, as many as fifty cords of wood, and some much more. We cannot alter the quantity of heat which a given quantity of fuel throws off in combustion, without altering its nature; but we can adopt means to *save* this heat and apply it to warming our rooms. Experiments have shown that by the use of a common brick fire-place, the owner pays *nine-tenths* of the cost of the fuel for the privilege of heating the air above the top of his chimney. The hot-air furnace is the best thing, by far, that we have seen, for saving fuel. A neighbor has kept several rooms of his house warm night and day, through the past winter, by means of one, and from his experiments it is clear that it will not require *ten cords* of wood for the whole year.

Another important advantage is keeping up only one fire for several rooms. As the wood is burned large, it saves much labor in cutting, and needs replenishing once only in five or six hours. Another advantage is the house-room saved, none being occupied by stoves or fire-places. Another is the prevention of dirt, the universal accompaniment of fire-places. It also renders all the rooms warm in the house, by night as well as by day, imparting to them the peculiar and comfortable warmth of the air of summer. It is safe—children do not burn their fingers, and if rightly constructed, the house is far less liable to take fire. And by no means a small consideration to the person who loves the *culture of flowers*, and who cannot afford the expense and care of a green-house, tender plants may be kept in any of the rooms, without the least danger of their being frosted, and with no other attention than that of watering.

The hot air furnaces commonly erected in cities are on an entirely different plan, and, in my opinion, greatly inferior. The one here described is the result of many experiments, and is the best form of several which have been tried. It was designed by William R. Smith, of Macedon.

A, is a longitudinal section of the stove, for the reception of fuel. It should be large to admit large sticks of wood, so as to lessen the labor of cutting, and to cause the fire to burn long without renewing. Three feet in length is not too much. The bottom, instead of being a plate, is a grating, made of cast iron bars, running lengthwise with the stove, supported at the ends and in the middle by cross bars. Through this grating



the ashes fall into the ash-pit B. The advantages of this are, the wood burns more freely, the fire need not be interrupted to remove the ashes, and the ashes are much better in quality, as they contain no mixture of charcoal. The doors, *a* and *b*, of the stove and ash-pit, should, if practicable, shut very closely for the better regulation of the draft, as the fuel will burn slowly for a long time when desired, as, for instance, during night and in mild weather, when the draft is nearly closed. All the air admitted to the fuel, should be through the ash-pit door.

C, C, C, C, are four flat, square, cast iron drums, connected by short cast iron pipes, and through which the smoke passes to the smoke pipe D, from which it escapes into the chimney, or passes out into the open air. As the smoke thus becomes much cooled before entering the pipe D, the soot accumulates more rapidly, and hence this pipe should be as short as practicable. It should however, have some height to cause draft, or should enter a tight small chimney, for the same purpose. The drums should have small openings for cleaning. They are supported by bricks not shown in the figure, to prevent confusion.

At a short distance from this apparatus, a double brick wall, with an included plate of air, is built round the whole. It is covered by a layer of bricks, supported by iron bars, and on this a layer of four or five inches of ashes, covered again by brick, mortar or boards.

It will be observed that the greatest part of the heat of the burning fuel is thrown out from the drums, and heats the surrounding air; this heated air is confined within the brick air chamber, and it escapes through the air pipes, E, E, into the rooms above. The object of the double walls, is the more perfectly to confine the heat, and to prevent its escape through any other channel. Probably, if the included space between the walls, were several inches in thickness, and filled with dry ashes, or still better, with powdered charcoal, this would be more completely attained. If the inner wall is occasionally braced by a cross brick to the outer, it need be only two inches in thickness or composed of bricks on edge.

The furnace should be built in a room in the cellar entirely devoted to the purpose, and a window left open for the admission of fresh air to the chamber; or if this cannot be done, a trunk or pipe one foot square, should lead from without through the wall to the chamber. In the former case, several air holes, four inches square or more, should be made at the bottom of the chamber.

On one side of the chamber, should be two double sheet-iron doors, for admission in cleaning the drums, &c. and sufficient space for this purpose should be allowed between the drums and the walls.

The pipes E, E, through which the hot air escapes to the rooms above, should be of bright tin, and as nearly vertical as possible, and from eight to twelve inches in diameter. The larger they are, the less the temperature of the air chamber need be raised to heat the rooms above, consequently less fuel is required, and the cast iron will not burn out so soon.

In the seventh volume of the *Genesee Farmer* is a description of a furnace somewhat similar; but the drums are there placed in succession *above* the stove. In the present plan, the descent of the smoke causes it to throw out its heat more completely; and as the last drum is the lowest, the coldest and freshest air comes in contact with it, and the smoke passes off at a lower temperature than that of the air in the upper part of the chamber. But great care is necessary to have the drums tight, to prevent the escape of smoke into the chamber, and for this purpose the cracks at the joints should be stopped with a paste made of iron filings or turnings mixed with sal ammoniac and water.

The expense may be diminished by substituting sheet iron for cast iron for the two last drums.

Circular brass or iron grates, turning on the centre, placed in the floor of the room, over the air pipes, E, E, regulate the quantity of hot air admitted.

This method of warming houses has been found preferable in point of *health* and comfort to any other; and the only objection appears to be, we do not have the cheerful "blazing hearth" to gaze at. But habit, which created our desire for this, will soon remove the difficulty, and most will learn to prefer a book, a picture and a stand of fine flowers in winter, to blazing sticks, smoke and a heap of ashes.

Should any one wish further information, I would communicate it with pleasure, through the columns of the *Cultivator*. Very respectfully,
Macedon 3 mo. 1840. J. J. THOMAS.

From the Journal of the American Silk Society.

THE GRAPE VINE.

There are few things that afford more pleasure for the expense of time and trouble than a good and well-managed grape vine. From considerable observation the editor of this Journal was led to conclude, that a very erroneous practice was generally pursued in relation to grape vines; and three years ago determined to try an experiment. The error in practice alluded to is this: the vine is permitted to grow to the full extent of its ability, and thus every season a large portion of wood has to be cut off and thrown away. It occurred to the writer that this waste of the power of the plant might and ought to be prevented. Accordingly in the spring of 1837, he obtained an *Isabella* vine, one year old from the layer, having a very good root, and planted it in an ordinary soil, of rather a sandy quality, putting a wheel-barrow load of wood-yard manure and old lime mortar about

the root. As soon as it began to grow he rubbed off all the buds but one, and trained that perpendicularly, rubbing off during the season all side shoots; and when it had reached to the top of a second story balcony nipped the end off, thus stopping its further growth. In the spring of 1838, he rubbed off every bud but two at the top of the vine, and trained these two along the front of the balcony, having stretched a large wire along the posts for their support. He rubbed off every side bud during the season, as at first. Both shoots made about thirty-five feet of growth this season. In the spring of 1839, every joint on the horizontal shoots was permitted to send forth its buds, and to grow unmolested, till the branches had fairly set fruit, generally until they were about 18 inches long. Then the end of each branch was nipped off, and its further growth prevented. The perpendicular stem was carefully prevented from sending out buds. The whole plant was carefully watched that no more buds might be permitted to grow—each one being rubbed off as soon as it appeared. Thus, from about the middle of June, the vine was not permitted to form any new wood. During the season the grapes grew uncommonly well, and every one ripened in good season, and was very fine, as was proved by the numerous company at the Horticultural Society exhibition, who unanimously pronounced them the finest grapes there. The produce of this vine was *three hundred and fifteen bunches*, all very large, and the berries of uncommon size. The society awarded to them its first premium for native grapes. Almost every body, however, doubted whether the plant had not been injured by this excessive bearing of fruit; and many old gardeners considered that it would be killed by it. The writer never doubted on this score. He had only compelled the plant to *make fruit*, instead of wood to be cut off and thrown away, and has no doubt that if he had been able to get the season before a greater length of wood for fruit branches, the plant would have supported a much larger quantity of fruit. On trimming the vine preparatory to its bearing in 1840, there was very little wood to be cut off. Only two buds were left on each branch of last year's growth, and these are now growing and showing fruit buds very finely. The vine is not dead, nor does it appear to have been injured in the least by last year's hard work. So far, the experiment is beautifully successful, and we now feel authorized to recommend this plan to all who love fine fruit. It must be borne in mind that the experiment was made with the *Isabella* grape; we of course cannot say any thing about its applicability to other kinds from *experience*; but the same reasoning applies with equal force to all kinds. If the powers of a plant can be turned from the formation of wood to that of making fruit, as we have proved it can in the case of the *Isabella* grape, we do not see any reason why the experiment may not be successful with all kinds of grapes and fruit. One thing we do know, that a plant that bears fruit does not grow as much as one that does not; and we are hence authorized to infer, that the power of the plant may be directed at pleasure, either to the growth of fruit or of wood—that by suppressing the one, you may increase the other, to a very great extent. The vine above described has attracted the attention of numerous persons, and many have determined

to follow the example. It may be observed that this vine occupies no room at all in the garden. It grows close in the corner of the house, a single stem ascending fourteen feet to the balcony, when it starts off horizontally, as above described, along the balcony. Thus every house in any city that has a yard at all, so that the vine may be set in the earth, may have just such a supply of delicious grapes as the writer of this had last fall.

G. B. S.

From the New England Farmer.

POULTRY.

We have much pleasure in presenting to our readers the reply of our friend Hunt to the queries put to him a few weeks since in the N. E. Farmer. They are full and satisfactory. We should be glad to hear again from our correspondent at Roxbury, who can, no doubt, if he will, give us some valuable suggestion from his experience. We published in our last the amount of eggs exported from Westport to New York market. The number of eggs and the amount received for them were enormous, and show that "many littles make a mickle."

"The capital invested in poultry and rabbits in Great Britain is estimated at £10,000,000 sterling." "When we look," says McQueen, "at the immense number of eggs brought from Ireland, (50 tons of eggs and 10 tons of live and dead poultry have been shipped from Dublin in one day,) and 66,000,000 eggs imported from France for London alone; and this immense number a trifle certainly to what are produced in this country, we shall cease to wonder at the large capital here stated to be invested in poultry of all kinds. The quantity of eggs imported into Liverpool from Ireland in 1832, was 4097 crates, value £81,940 sterling; which at 6d. per doz. gives 3,277,600 dozens, and the number 39,331,200. In 1833, the import had increased to 7,851 crates, or upwards of 70,000,000. The number imported into Glasgow from Ireland in 1835, by the custom house entries, was 19,321 crates, which at nine eggs to a pound, gives the number, 17,459,568.

The production and consumption of poultry, game, &c. in Great Britain and Ireland, may be judged of by the consumption of Paris, in 1822, of the following articles and animals, according to Count Chalmers—931,000 pigeons, 1,289,000 chickens, 549,000 turkeys, 328,000 geese, 131,000 partridges, 177,000 rabbits, 174,000 ducks."

This shows the magnitude of an interest which is deemed by most farmers of too trifling consideration to be worth making any calculation about.

It is, without doubt, a proportionately great interest in this country, yet who in this aspect deems it worth attending to.

As to our good friend Hunt's pertinacity about his personal beauty, it will be seen that he struts about and crows as loud as any old rooster. Now we shall not dispute the point any farther with him, but quit the yard; and, as most people do who hear him, we agree to "sign."

H. C.

Wyoming, Penn., April 20, 1840.

Dear sir.—In reply to the inquiries in your paper of the 5th inst., I answer—

1. There is but one way to keep your roosters separate, and that is to have separate yards for them. A yard five feet by ten is large enough for a rooster and twelve hens.

2. I give my hens flesh raw or cooked, just as is convenient. When I could obtain it, I gave the liver, &c., of any animal, cut up into small pieces. One sheep pluck I found sufficient for nineteen hens and two roosters for seven days. Fat pork, boiled or raw, always sets the hen a singing—a sure precursory of laying.

3. A temperature of about *temperate* is best. This is generally obtained by a tight room with glass windows. I am satisfied, however, that a small stove, in severe weather, would be of great service. I am preparing a house thus furnished.

4. Young chickens for the first week require a temperature of from 75 to 80 deg. Far., and at night always about 80 deg. This last may be obtained after the chickens are over a week old, by a tight box, with a hole in one end, at the bottom. The heat of the bodies of the chickens will soon raise the temperature to the right degree. I observe here, that I found my opinion as to the degree requisite for young chickens, on actual experiment with the thermometer and the old hen, following nature as my guide; she is generally right.

5. I raised one hundred and fifty chickens in a room twenty-five feet long and seven feet wide: two feet high in front, and four feet high in rear. The roof was covered tight for the space of four feet, the remaining three feet and the front of the room was covered with slats just far enough apart to keep the chickens from getting out. The chickens were put into this, having a southern exposure, after they were about two weeks old, and kept there until they were well fledged. The tight box of course placed in the oven for them to sleep in. The three-foot slat covering I had made so that I could remove it, to get into the room if necessary. A pan for water and for food, with the sleeping box, furnishes the room.

6. If you put one old hen in, she will kill all the chickens except her own.

7. Answered in 5.

8. You may take the young chickens as soon as they are a day old from the hen. It is best, however, to let them remain a day or two.

9. Answered in 5.

10. I gave my hens raw carrots. They would not eat them. They are fond of raw turnips cut up; also of ruta baga. I suppose that any food they will eat is good for them.

11. The moulting varies. Hens in good condition moult in a shorter time than those which are poorer.

12. I have not been able to ascertain "the habit" of the Creole. They are white with black spots all over, except the neck, which is perfectly white. Their tails are more fan-like or displayed during laying time, and their rumps present a fuller or more elevated appearance than other chickens. The ends of the tail feathers are generally blackish. They can be obtained about Philadelphia. The purest kind can be obtained in Buckingham, Bucks county, Pennsylvania. My good friend, William H. Johnson, of that place, will cheerfully direct to such persons as have them. They are capital layers—poor setters.

13. Judge Burr, of Vincent Town, New Jersey, has the Booby hen, and the finest collection of

poultry I have seen any where.—The long Bucks county hens weighing so much, are Malays. They are not good layers, and their eggs are very apt to have two yolks; of course do not hatch well.

With respect.

THOS. P. HUNT.

N. B.—You are wrongly informed as to my teaching my children to believe me to be "the handsomest man," &c. I was not under that necessity. They believed it by intuition—and I insist upon it that that which is intuitively true, cannot be *demonstratively* false. Of course, I am not content to admit, then, that your judgment is infallibly correct. All that I can admit is, *your* judgment is sincere; but my *children* say they have never seen a man as handsome as I am, nor do they believe that you have.

REMARKS ON THE PROPRIETY OF USING MARL IN SOUTH CAROLINA.

[From the Carolina Planter.

Mr. Editor.—So far as I have seen or heard, all those who are anxious for a geological survey of the state, seem really and practically to have but one object, viz. the discovery of marl. Without intending to discuss the propriety of calling this hunt after marl, a geological survey, or whether it would not be cheaper and every way more expedient for the state—if she must do something—to appoint some one skilled in the art of finding and using marl, to search for that alone, or if you please, for that and other calcareous manures, permit me to ask a few questions of you or some of your correspondents acquainted with the subject, I do not ask them idly. I happen to live in the neighborhood of an exhaustible bed of shells, and, as we suppose, marl also, with which at a moderate expense I could cover my whole possessions. I wish, however, to know from some authentic source, how I am to proceed, and *what I am to gain by it*, before I venture. Will you do me the favor to inform me, then, what marl is. How many kinds there are? What are the tests of each? In what condition it is generally found, and to what condition it must be brought before it can be employed as a manure? The simplest and cheapest manner of preparing it? What quantity should be put on the ground per acre? The best manner of doing it? And, most of all, how much it will increase the produce per acre? And how long it will last? Satisfactory answers to these questions have probably been given again and again, but they are unknown to me, and to most of your readers probably. I do not take Mr. Ruffin's work, it is too far north for me. If the matter has been fully treated there, could not you or some of your correspondents collect and condense what he has said, and make an application of it to our soil and to our staple? My land is in general light and sandy. Your excellent remark, that liming such land, was like giving "bitters without beef steak," confirms an opinion I have always entertained. And I am afraid marl will act in the same way. Before I try the experiment I should be glad if possible to know something certain about it.

MIDDLE COUNTRY.

[We are the more pleased to learn from the

above article, (inasmuch as it proceeds from one who seems to esteem marling very lightly,) that there has been already excited in South Carolina so much interest in regard to marl, and so much anxiety to discover its existence. We agree with the writer in *one* at least of his positions; that is, that a geological survey is not necessary to discover the existence, or to fix the value, of marl beds. And though in a recent address, delivered before a southern agricultural society, the discovery and appreciation of marl, and the consequent great value added to the poor lands of lower Virginia, have been ascribed to the *geological survey* of this state, we make bold here to assert that the geological survey had no more agency in producing this improvement than it had in exciting the Seminole war.* And, indeed, if it has produced any good effects to the general and agricultural interests of Virginia, of as much worth as the marling of even 100 acres of poor land, we confess that we are unacquainted with all such results.

The interest excited in regard to marl and marling in South Carolina must lead to the proper use of the great resources for agricultural improvement and wealth, which have been heretofore, or until very recently, entirely neglected there. And even if those most interested in the matter continue to refuse to receive information from any experienced source, merely because it comes from a distance, the zeal and intelligent observation of new beginners in South Carolina will ultimately arrive at experience and truth, though through all the disadvantages and all the losses that must attend an untaught and unaided apprenticeship in this new business. We could assure this writer, (if he could ever hear any thing uttered so "far north,") that although the person he names succeeded in quadrupling the income and value of his land by the application of marl, yet, while so laboring, untaught by books, and unaided by experience, that he encountered losses from his ignorance which were more than enough to have paid for as extensive and profitable improvements as he made; and that the lights of experience now published, and which then had no existence, would, if then attainable, have been worth, as aid, thousands of dollars to his first few years' labors. He did not then, or since, think that any information applicable to his wants and his ignorance came from "too far north," or too far south; and he would have rejoiced to have obtained light,

if it had existed, whether from scientific research, or practical observation, from any available source, or any remote region. However, these remarks will not be seen by "Middle Country;" and if they should be, by being republished, he probably will attribute them to our anxiety to secure the profit of selling him a 50 cent pamphlet, which, if desired, would be gladly *given* to him or to any other person who would probably receive benefit from its instructions. We do not know, however, that "Middle Country" would consider our precepts and facts as coming from "an authentic source."

A general remark is called for here by the concluding passage in the above article—though we have said and urged the same, in different forms, many times before. We did not happen to see the piece of our esteemed fellow laborer, the very intelligent editor of the 'Carolina Planter,' which compared "liming light and sandy land" to giving "bitters without beef-steak," and therefore we may not comprehend its scope and force. But we entirely concur in the expression *in one sense*, which was, we presume, that in which the editor spoke—and as much dissent from it in *another sense*. It is very true that marl, or calcareous earth, does not act *directly* by furnishing food to plants, or as dung and other putrescent manures do; and whoever marls under mistaken views in this respect will probably incur loss, if not do actual injury. If *all aid* from putrescent manure, in every form, were withheld, and if the very customary system of unceasing exhausting cropping is pursued, then indeed, to land so treated, marl would be, in a great degree, "bitters without beef-steak." But, on the other hand, it is not necessary that artificially prepared putrescent manures, from the stable or barn-yard, should accompany marling, to render the latter highly profitable. That, if attainable, would certainly be better; but without a load of such manure being applied, enough putrescent matter may be given to land to enable marl to double or even quadruple its products, by merely letting the land rest, and be covered by, and not be deprived of by grazing, its own natural growth of vegetable matter, by which nature manures every soil that is capable of being enriched; unless where man acts to cut off, or render useless, this natural and abundant supply. Yet without calcareous earth to combine with it, and render it operative, and to *fix* it in the soil, this or any other supply of vegetable manure given is not only like "beef-steak" without "bitters," (reversing Dr. Gibbs' metaphor,) but also is given to a stomach so weak as to reject, or to refuse to digest, either beef-steak or the lightest and most nourishing aliment. When such rejection, by a

* "By a geological survey of Virginia, in a district of country considered unimportant, beds of marl have been discovered and analyzed; and, by successful experiment and application to a poor soil, have enhanced the value of lands from comparatively nothing to a very high price." *Address to the Agr. Soc. of Barbour, Ala.*

weak and disordered stomach, is caused by the presence of *acidity*, Dr. Gibbs would certainly administer lime-water, or magnesia, or some other calcareous or alkaline neutralizer of acids. In precisely the same way let him reason as to the acid soils of South Carolina. Give marl to destroy the existing acid, (which acid forbids improvement and destroys the productive power of the soil,) and to create digestive and assimilating action, and let the land have but a moderate and *profitable* share of rest, to enable it to produce vegetable manure for itself, and we will venture to assert that the result will be a doubling of permanent productive power, and of net profit on the cultivation, within two years after the commencement of the course of improvement.

But as unreasonable as is such a deduction, it is generally the case that new marlers expect to derive this great profit without paying any thing of the necessary consideration required to secure it. Marl is applied to land that perhaps has been severely cropped in corn or cotton for a dozen years before, and without any more rest, or other means to obtain vegetable food, being allowed afterwards. Of course there is so little effect seen from marling under such circumstances, that the experimenter considers and so reports it as *none*, or almost *none*—and thence he concludes that the manure is worthless, and, perhaps, all that has been promised from it, (under very different circumstances,) as altogether false. We have known many, very many cases of this kind; and have been greatly surprised, until the frequent recurrence of the same thing became custom, that intelligent cultivators should overlook and neglect every *condition of success required*, and distinctly stated as such in the instructions published, and yet expect the degree of success which the observance of those conditions would have secured.

But if the requisite of vegetable or putrescent manuring is enforced on men's minds, then will come another grand objection. "Oh! if I am to manure in some other way all the land I marl, I cannot marl much; and for so much, the land could do very well without marl." Wrong in both of these positions—though we cannot here discuss them in full. We will merely say that while we were barely able to give prepared putrescent manures to 10 acres of land a year, (and sometimes did not to 5 acres,) that rest and natural vegetation served to manure (however slightly) 100; and that the whole 100 acres were easily marled the same year. And further, if without the *medicine*, marl, or "bitters" so given, that the "beef-steak," or food alone, both the rich and the poor, would have produced but little visible effect, and certainly no clear profit.

The writer of the foregoing article certainly imposes on Dr. Gibbs a great and most unreasonable task, and which would require the labor mental and physical, of a year, for him to perform fully. Nevertheless, if he will undertake it, to any extent, we are satisfied that the task would be in excellent hands; and we shall be among those who will most heartily rejoice at the means being thus used, in the most palatable and effectual manner, to give to the planters of South Carolina the instruction which they so greatly need, and which would offer to their acceptance such great individual profits and general improvement.

ED. F. R.]

EXTRACT FROM THE REPORT ON THE CULTURE OF THE MULBERRY, AND THE MODE OF REARING SILK WORMS IN THE ENVIRONS OF PARIS, IN 1836.

Made at the Royal and Central Society of Agriculture, in the name of a special Committee composed of MM. the Viscount Debonnaire de Gif, Jaume Saint Hilaire, Audoin, and Loiseau Deslongchamps, reporter.

Until now, they were generally in the habit of judging of the product of the rearing from the yield of an ounce of seed, but the number of eggs being liable to vary in the quantity from forty to fifty thousand, M. C. Beauvais thinks it more rational to determine it from the weight of leaves used for so many pounds of cocoons. At the south it is generally supposed that two thousand pounds of leaves, not culled, are required to feed worms of an ounce of eggs, which produces on an average from fifty to sixty pounds of cocoons.

In taking the weight of the leaves for the basis, two thousand pounds of leaves have produced one hundred and eighty pounds of cocoons in the last rearing made at the *Bergeries*. M. C. Beauvais did not give us in his various notes, the precise details of the expenses of his rearing; we have merely found that it results from the general accounts which include the rent of the ground, the ploughing, the trimming of the mulberry plants, the interest of the capital of the plantings and of the cocoonery, the expense of the gathering, of manual labor, the heating and lighting, etc.; that the pound of cocoons of sixteen ounces, amounts only to fifteen cents. M. C. Beauvais has undertaken, for seven years past, on silk worms, a set of experiments which may be usefully put in practice. In the note he gave us upon that subject, he insists principally, upon the means by which one can obtain a perfect equality among the worms. He thinks that the success of rearing depends upon the worms going *regularly* through the different stages of existence. He wishes them to hatch as simultaneously as possible, that their moultings should be accomplished at the same time; and that at last the worms should mature at once, that there may not be any dilatory among them, during the most essential period of their existence, the *formation* of the cocoons.

To obtain such advantageous results, under all circumstances, M. C. Beauvais states that regularity in feeding the worms is one of the best

means that can be made use of; and he is besides persuaded, that instead of using common stoves, that distribute the heat more or less irregularly, preference should be given to M. d'Arcet's apparatus, which has the double advantage of distributing the heat equally in all parts of the apartment, and to purify the air by constant ventilation.* We highly approve of the views of M. C. Beauvais, and with him, we recommend to the growers of silk worms, the use of the apparatus for the purpose of heat and ventilation.

M. C. Beauvais has tried carefully to discover the causes of the diseases to which silk worms are subject. His experiments have led to the discovery that many of them originate from imperfect eggs, or bad stock. He insists, therefore, not only on a judicious choice of the cocoons, which must always be of the most beautiful and even species, but he advises when the millers have left them to reject all those that have any defects, and to preserve for the reproduction those only which give the appearance of a strong constitution. The male miller according to M. C. Beauvais, must have projecting eyes, long horns, very thick and arched: wide but slender body, covered all over with a glossy down; in fine, the wings must be large, and spread out. The rearer must throw aside the males that have part of their bodies bare of down, and of which the lower rings are darker than the rest of the body; above all he must reject all the males that have short wings clipped or folded up. The female must exhibit the same character as the male, with this difference, that the body must be wide and flexible. All females whose bodies are immeasurably long, showing in each movement rings without down, must be thrown away.

* * * * *

The same may be said of an experiment of another nature, which M. C. Beauvais made in the spring of 1836, in rearing a certain quantity of worms after the method of the Chinese. According to that method they feed the young worms forty-eight times the first day they are hatched, thirty times the second, twenty-four the third, and twelve during the remainder of the time of rearing. At the same time that the worms are fed in this manner, they are kept in a high temperature, which is from 93 deg. to 95 deg. Fahrenheit during the first two stages, and from 81 deg. to 84 deg. Fahrenheit during the rest of the rearing. By this method the worms, according to M. C. Beauvais, eat more, while they consume less leaves, because they make much less litter, and the time of rearing is shortened. That which was made in 1836, at the *Bergeries*, from this process, lasted only twenty-one days, and from what has been stated to us, the worms evinced during the whole course of their existence, a strength and vigor which are not common to them in the rearing effected in a lower temperature by 9 to 11 degrees, and which lasts ten or twelve days longer.

According to M. C. Beauvais, the advantages which would result from a rapid rearing extend to all the economical circumstances of this industry. They embrace the mulberry trees, manual labor, the buildings, and even the success of rearing; but all these advantages cannot be obtained except the heat, dampness, and the frequent feeding,

are in perfect harmony together, for these three considerations are so intimately blended, that unless they perfectly accord, he does not think they can succeed, and believes too, that they may expect greater mistakes than upon the old plan. Thus the experiment of rearing silk-worms under the influence of a high temperature, made by M. C. Beauvais in 1831, and renewed in 1832 with an excellent heating apparatus, completely failed. It was only in 1836 that it succeeded, in adding to the high heat continued feeding, and a certain constant dampness.

With a temperature of 81 to 84 degrees Fahrenheit, you must keep up a moisture of 85 to 90 degrees of Saussure's hygrometer.

It would, no doubt, be a very great advantage if it were possible to diminish conveniently the duration of the period of rearing, for it might furnish the facility of attending several rearings each year, whenever a double or treble quantity of mulberry trees could be had. This is what your reporter has explained elsewhere. But whilst we commend the generous efforts of M. C. Beauvais to perfect the progress of the art of rearing silk-worms, your commissioners dare not recommend the new method to accelerate the mode of rearing to those just engaged in it. They can only manifest the hope, that new and multiplied experiments will be made on that subject. They ought not, besides, to allow those persons occupied with this industry to be ignorant of the fact of their dreading that in shortening the life of the silk-worms, they should not have time enough to digest, in a proper manner, the nourishment they take; that the juices which must be identified with their own substance, are not sufficiently perfect to facilitate the secretion of the silk, and that secretion being too precipitate has not all the qualifications required for the worm to spin its cocoon and compose it of a thread both firm and solid.

We regret that M. C. Beauvais did not give us a certain quantity of cocoons of his rearing, brought forward by the means mentioned above, so that the silk could be removed, as effected in those of his common crop; but we ought to mention on this subject, that M. Boissier de Sauvages had already tried to rear silk worms under the influence of a high temperature, and that he had succeeded by this method to abridge the time of rearing in such a manner that it only lasted 24 days, instead of 36 to 40. This author states that the product obtained was abundant.

M. C. Beauvais proposes to make this year, new experiments on this method, and he has even the intention of raising the temperature of the locality in which he means to place his worms, so as to shorten the course of the rearing, and to reduce it to eighteen days, if possible.

On this subject we shall observe that if we must yield to the opinion and experience of M. Boissier de Sauvages, there is a term beyond which it is not possible to shorten the life of the worms, for the period was absolutely the same in two rearings undertaken in a high temperature, although, in one of them the heat to which the worms was subjected was greater by four degrees, than the other. Finally, we will express again our fear that the silk produced too rapidly under the influence of a very high temperature, will not have the same qualities as that raised under ordinary circumstan-

* See description and plan of D'Arcet's apparatus at p. 77 of vol. VIII. Far. Reg.

ces. In fact, we learn from several persons well versed in the manufacture of silk, that this material coming from warm countries, such as India, Syria, &c., is much less esteemed and cheaper than that which has been collected from the temperate parts of Europe. For this reason we shall not fail the next season to gather a sufficient number of cocoons produced by a rapid mode of rearing, to enable us to compare the intrinsic quality of their silk with that of the same material obtained by means of the old process. Until then we shall forbear giving our opinion on the merit of the abridged mode of rearing by the influence of a high temperature, and we think it must be left to time and experience to prove what this method will show in the way of advantages or difficulties.

It is very desirable that all the worms should hatch the same day, that the period of their moulting should not be different, and finally their ascent on the spinning frame should be made, if not exactly at the same hour, at least in a short space of time, as, for example, in one day. M. C. Beauvais thinking that the inequality, more or less great, observable in worms of the same rearing, proceeds from the cause that the female butterflies are not generally hatched the same day, and also because they take several days to make up the amount of their laying, though that all the inequalities observable in the different stages of the existence of worms, might originate in the manner in which the eggs are made in the common way. To remedy this inconvenience, M. C. Beauvais tried at the time of his last crop, the following process. He selected at first ten times more cocoons than are necessary to produce one ounce of eggs, and as the millers came out, he preserved only those hatched the same day. Afterwards he did the same thing for the eggs that were laid by the female millers after their fecundation by the males. Instead of preserving all the eggs of the whole laying, he reserved for a future rearing, those only laid by the females during the twelve first hours after their separation from the males. We ought likewise to mention, that he managed so that the length of the coupling should be the same for all the females, and as he had kept ten times more cocoons than were necessary to make an ounce of eggs the first day the millers came out, as soon as he had enough males and females to give him the quantity of eggs he required, he stifled the chrysalis in the remaining cocoons so as to preserve them for reeling. By means of this process M. C. Beauvais hopes that these eggs having all been produced at nearly the same time will have all the qualities necessary to hatch simultaneously and with an equal and perfect organization. It will then be the business of the rearer, he tells us, to do nothing to interrupt this harmony during the life time of the worms; and the palm will be given to him who will obtain a spinning as rapid and regular as their hatching has been.

Such are the hopes of success that M. C. Beauvais entertains of this new method of producing the eggs. We hope sincerely that he will not be disappointed in his expectations, and that he may obtain such happy results; but we ought to mention to you, gentlemen, it appears very difficult that, notwithstanding all his care and precaution, he should succeed in reforming completely the inequality between worms of the same rearing, an inequality due, perhaps, to one of the laws

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of nature, for we remark it every where among living beings. However, if even the new experiments of M. C. Beauvais, on the method of improving the laying of the eggs of the silk-worms should not have all the success wished for, it is nevertheless probable that the practical rearing and physiological history of the insect will derive advantages therefrom.

During the rearing that this able and zealous agriculturist made in June, 1835, sixteen young men, established themselves in the *Bergeries de Senart*, and every day they were at the establishment to assist in all the operations concerning silk-worms, and to instruct themselves by practice. In the spring of 1836, the same thing was renewed, but the crowd of persons, who came to learn the art of rearing silk-worms in the model cocoonery of M. C. Beauvais, and to perfect themselves by the lessons of such an excellent master, was greater than that of the preceding year. Your commissioners visited the *Bergeries* twice during the course of the labors and they found each time a collection of thirty persons, composed not only of young men, but of men of all ages, who, during one month, drew such instruction from the establishment, that each of them was capable of managing a cocoonery himself. This is what we ascertained at the period of our second visit, from the many questions put to them, and the satisfactory answers received. Thus in a very short time M. C. Beauvais will have made excellent scholars, who will be able in their turn, to give solid instruction, and diffuse good methods in those districts, where they intend establishing this new branch of agricultural industry.

M. Henry Bourdon, began to plant mulberry trees at the end of the winter of 1835, and since that time he has increased his plants in such a manner, that now he has thirteen and three-fourths acres of trees of this species planted permanently, and at various distances, according as he wished them to be more or less developed. The nearest ones are about four feet from each other, and the farthest ones, are from ten to eleven feet. This planting made on thirteen and three-fourth acres includes in all 10,715 trees, viz:

Multicaulis	-	-	-	5,015
Trees grafted in May, 1836	-	-	-	4,100
Wild mulberry trees which must not be grafted, and of which the leaf is intended to feed the worms in the first age	-	-	-	1,600
He has also appropriated a space of ground for a nursery, in which he has	-	-	-	
now young plants of two years	-	-	-	5,300
Young plants of one year	-	-	-	15,000
Cuttings of multicaulis	-	-	-	10,000
Total	-	-	-	30,300

which 30,300 mulberry trees, added to the 10,715 planted in the thirteen and three-fourth acres stated above, gives him a total of 41,015 trees, all intended for low trees.

The greater part of these mulberry trees being yet too young in 1836, to yield the quantity of leaves, M. H. Bourdon required to feed the worms he intended rearing in the spring, he tried to get some in his neighborhood, and he was fortunate enough to find a sufficient quantity to feed the worms produced from two ounces of eggs.

Twice, gentlemen, your commissioners called on M. H. Bourdon to see his mode of rearing silk worms.—The first time was on the 4th of June, and the 2d of July, at the moment of the gathering of the cocoons. At each of these visits the cocoonery was examined by them with the greatest care in all its details, and they have always been very much satisfied with the perfect order which reigned, and with the good care bestowed on the worms.

M. H. Bourdon, at our suggestion, kept a regular journal of the rearing made in the month of June last. We here give you a short extract so that you may know the result. The eggs taken out of the cellar the 19th of May, and brought gradually to the temperature of 70 deg. Fahrenheit were placed on the next day in the room intended for the hatching, where the temperature was successively raised one degree per day and the hatching commenced the 26th at a temperature of 79 deg.

M. H. Bourdon has raised silk worms from three kinds of eggs, which were decidedly different from each other, and which yielded him various products. A rearing of three-fourths of an ounce, made with eggs received from Roquemaure, in the south of France, lasted only thirty-one days, the worms having been kept constantly in a temperature of 75 deg. Fahrenheit, and the duration of the different stages has been as follows:

"The 1st stage lasted	-	-	-	6 days
" 2d " "	-	-	-	5 "
" 3d " "	-	-	-	6 "
" 4th " "	-	-	-	6 "
" 5th " "	-	-	-	8 "
Total,				31 days

During the whole period of rearing, they were fed six times a day, without counting occasional intermediate feedings, as the worms seemed to require it.

The hurdles were changed every day during the first stages, also during the fourth and fifth stages, but were changed only every other day during the second and third stages. When the worms had moulted instead of immediately giving food to them M. H. Bourdon waited 24, 30, and even 36 hours, and the method proved favorable to their health and the economy of the leaves. He supposes that after the fatigue of moulting, the worms have need of rest.

When the worms came to maturity, their ascent on the spinning frames was accomplished in thirty-six hours, and it was remarked, instead of crawling for some time, as is often the case, they began spinning almost immediately. There were very few imperfect cocoons. The quantity of leaves consumed by the worms hatched from the three-fourths of an ounce of eggs that came from Roquemaure was 1000 pounds and the product in cocoons 75 lbs. These cocoons were of a very good quality, and of a very pure white, like those of the beautiful *Sina* species. It required 240 to 260 to make a pound.

We have already spoken to you, gentlemen, of a species of worms called the *Syrian* which M. C. Beauvais attempted to cross with the *Sina*. We shall not repeat the remarks already made above, respecting this crossing; we shall only observe that it is with the variety of worms produced by the coupling of the *Syrian* males and *Sina* females,

or males of this last variety with the *Syrian* females that M. H. Bourdon has made several interesting experiments. We could not relate them all without exceeding the bounds of this report, and that is the reason why we shall be satisfied to give you the following. Struck, like M. C. Beauvais, with the irregularity which almost always exists in the hatching of the eggs as well as at the time of the moultings and of the ascent, M. H. Bourdon thought that this irregularity might be attributed to the use of the eggs laid at different times in the rearing. In order to ascertain if the irregularity in the different phases of the existence of the worms was owing to the causes he suspected, he arranged in 1835, at the time of the laying of the female millers, two different cloths to receive the eggs. On the first cloth he caused the laying of half of the female millers to be complete; on the second cloth, on the contrary, he received only those eggs laid during the first twenty-four hours by the other females. In the spring of 1836 the two kinds of eggs, obtained by these means, having been placed at the same time in the hatching apartment, those proceeding from the first cloth took two days to perfect their hatching, while those of the second, proceeding only from the laying made in twenty-four hours, took only one day to hatch. There remained but an insignificant number of eggs. M. H. Bourdon has besides assured us that the worms hatched in twenty-four hours, had constantly a great superiority over the others, as much for their equality and regularity during all their stages of which the moulting and the ascent are the principal, as for the economy of the leaf. It is hoped that new experiments will confirm these fortunate results, and if those of the same nature, undertaken by M. C. Beauvais, succeeded equally well, the rearers, will no doubt hasten to adopt this new method of procuring eggs. In that case the loss of several hundred or several thousand cocoons will be trifling, compared with the advantages which might result from this improved process. We omitted to mention that the cocoons spun by the *Syrian* worms were much larger and heavier than any we have ever seen. One hundred and ninety-seven of those cocoons taken by chance, weighed one pound, and in selecting the finest and heaviest, 167 only were required to make up the same weight.

The third variety of eggs that M. H. Bourdon caused to be hatched in May, 1836, was sent to him from Valencia, in Spain, a country which was formerly much famed for its silk worms. These eggs, far from answering his expectations, occasioned him enormous losses. First, those from Valencia hatched in a very irregular manner; afterwards, at each moulting, and even at every change of the hurdles, the mortality among the worms was very great. A sufficiently large number of worms which had dragged on their existence until maturity, died at the moment of their ascent upon the spinning frames. Lastly, from an ounce of eggs hatched, M. H. Bourdon extracted but three pounds eight ounces of cocoons, for which product he fed out one hundred pounds of leaves. He is doubtful whether he is to attribute this drawback to the journey, to the change of climate or to the manner in which the eggs were produced. In the actual state of the science it is still impossible to determine what can be the causes which

have been so hurtful to the worms produced from the eggs of Valencia, in Spain. Your reporter can only mention that he received in 1824 eggs from Smyrna in the Levant, which, after having travelled by sea, were sent to him from Toulon in a letter by mail, and the worms coming from this seed showed no particular disease, and they arrived at the period of their maturity without a greater number dying than is customary in the ordinary rearing. M. H. Bourdon in the arrangement of his cocoonery made many useful modifications, of which we give the following account.

First.—Instead of disposing end to end his hurdles which were two feet wide, and five feet long, he has juxtaposed them, two by two, and the width of the two hurdles united together is such, that a single person can direct the feeding on the whole surface in alternating from one side to the other; thus by this juxtaposition of the hurdles, much space is gained without an injury to the whole mode of operation.

Second.—By means of light wooden rods placed on the cross pieces of the props the hurdles can be removed easily.

Third.—The hurdles are arranged in such a manner, that the one placed on the outside, or at the passage, can be removed at will, which greatly facilitates the labor chiefly for the cleansing of the hurdles.

Fourth.—M. H. Bourdon makes use of nets like M. C. Beauvais to remove his worms from one place to another, or to divide them on the hurdles, but his nets are fixed on frames made of very light wood.

Finally, M. H. Bourdon has adopted in his cocoonery, to serve as props to his hurdles, a range of single posts, which can be easily taken to pieces after the rearing, so that the locality may serve for any other use.

All these modifications introduced in a small apartment appeared to us susceptible of being easily applied to a large establishment. It suffices to have seen them operate, to be convinced that they do not require a much greater increase of expense in the fixtures.

M. Aubert in 1836 reared worms produced from 2½ ounces of eggs proceeding from worms reared in 1835 by M. Boucher, and the cocoons of which did not appear to differ very sensibly from those of the *Sina* species, except that they were perhaps a little smaller and weighed less. The first eggs were placed on the 20th of May in a hatching room where the temperature was 63 degrees Fahrenheit, and it was brought the following day to 74½. On the 25th of May, the thermometer being at this last elevation, the hatching commenced at 2 o'clock in the morning according to M. Aubert's observation, and ceased at 10, and as very few worms were hatched they were not preserved. On the 26th the thermometer being at 77 deg. the hatching commenced again at 2 o'clock in the morning and continued until noon. Many more worms having been hatched than on the preceding day they were saved and fed. On the 27th of May the thermometer being still at 77 deg. the hatching recommenced abundantly, always at 2 o'clock in the morning and lasted until 5 o'clock in the evening. On the next day, the 28th, the temperature being still the same, the hatching began anew from one o'clock in the morning until eleven.

All the worms hatched during those last two days were reared with those of the 26th, but those hatched on the 29th, being much reduced to number were neglected. In this manner the entire rearing was composed of worms hatched the 26th, 27th and 28th of May.

The application of the excellent system of ventilation which we owe to our honorable colleague M. d'Arcet was made in the cocoonery of Neuilly, and the worms were maintained in perfect health. During the first stages M. Aubert fed his worms twelve times a day, from six to eight times during the third, and five times during the last two, to which slight repasts were added during the fifth stage.

On this subject we think proper to express our opinion that it would appear more rational to reserve the twelve meals a day, for example, for the last stage, which is the time the appetite of the worms becomes greater, and that it would be possible without inconvenience to reduce the meals to 4 or 5 during the two first ages. We advise rearers to make a few experiments on this subject.

During all sorts of weather the worms of the cocoonery of Neuilly had cleansed leaves only, and they were given to them cut into small pieces until the 3d stage.

From the second stage until the time of spinning, M. Aubert changed the beds of his worms every other day by means of framed nets let in the hurdles. The changes were made, with the utmost facility and the worms crawled up quickly on the new leaves which covered the nets, without scarcely any remaining on the litter. To give an idea of the promptitude with which the changes were effected M. Aubert assured us that during the 5th stage, two persons, besides a third one charged especially to remove the litter and to transport it out of the establishment, could in two hours attend to the changing of 48 hurdles, forming together a surface of 469 square feet. What rendered it easier to accomplish the changes on the upper hurdles was that M. Aubert caused pulleys to be placed in order to bring down all those that were too high and beyond common reach.

As the worms of Neuilly were hatched in three different days, three sections of them were formed, which during all the rearing continued to progress at certain intervals from one another. There has also been considerable irregularity between worms hatched the same day, and when we visited the cocoonery for the second time, the 13th of June, the worms being then at the beginning of their third stage, we took notice of a certain quantity which, as to size, appeared inferior and backward by several days. We observed a person selecting them carefully from the hurdles to put them aside. The heat of the cocoonery was 77 deg. during the first two stages; in the third it was limited to 72 deg. during the 4th it was between 70 and 72 deg. and finally it was not more than 68 degrees during the 5th stage. Under the influence of this temperature the worms of the first section crawled on the spinning frames on the 23th day, those of the 2d on the 30th, and those of the 3d section on the 32d day. To the dilatory ones six more days were required that they might all be spinning. As to the worms of the *Sina* species, of which M. Aubert only raised one eighth of an ounce, they spun on the 30th day, but a very small number remaining on the litter, and during the 48 hours

which followed they began, successively, to make their cocoons.

To prevent the worms from falling at the period of their ascent M. Aubert placed on the upper part of his spinning frames a band of canvases about 6 inches high, fixed outside, and which, without intercepting the air, has greatly contributed to preserve a large number of worms from falls, which hurt them and incapacitate them from making their cocoons. The expense of this was very trifling and well compensated by an abundant crop of cocoons. The consumption of leaves was,

during the first stage, -	-	12 lbs.	7 oz.
2d " -	-	48 "	3 "
3d " -	-	103 "	
4th " -	-	276 "	
5th " -	-	1,419 "	

Total, - - - 1,858 10

This quantity of leaves produced 167 pounds of cocoons.

The royal theoretical institution of Grignon did not wish to be behind in the improvements regarding this branch of agricultural industry, and accordingly M. Bells, director of that establishment, commenced in the year 1833 to plant mulberry trees, and on the 4th of July last when your commissioners went to Grignon, they found about 3½ acres of ground in a perfect state of cultivation, and planted with 1500 feet of mulberry trees of low stalks, of which four-fifths are grafted. It was with the leaves gathered from those trees that the rearing of last summer was made.

According to a statement given us by M. Bells, his entire rearing lasted 36 days, and this delay may be attributed to his cocoonery having been kept at a temperature, on an average, of 70 deg. (Fahrenheit,) and to the circumstance of the thermometer falling even to 68 deg. during the seven last days of the 5th age. This low temperature has no doubt lengthened the time of his rearing, and was the cause that the worms were eight days in mounting. Another more serious disadvantage has contributed no doubt to diminish the product of the same rearing, viz: that on the fifth day of the fifth stage, instead of increasing the food of the worms, he, fearing he would not have a sufficient quantity of leaves, diminished the quantity given to them instead of increasing it in proportion as he should have done. Thus the worms to which on the fourth day of the fifth age they had given 151 lbs. of leaves divided into nine repasts, had on the fifth day 121 lbs. instead of 190 lbs. which was requisite. On the following day, and until the end of the rearing, he continued to diminish the quantity of leaves at least one third, and gave them only four repasts in twenty-four hours, instead of from seven to nine, which was necessary. This no doubt had a direct influence on the crop, and perhaps diminished the product from 15 to 20 lbs. so that the 105 lbs. which he obtained might have reached to 120 or 125 lbs. had he not feared a scarcity of leaves. On the 14th of July when we visited the plantation of mulberry trees we discovered that his fears were groundless and it appeared to us that there remained as many as 3 or 4 quintals of leaves on the trees, which fifteen days previous, could have been gathered with advantage to complete the feeding.

On this last subject we cannot conceal from you that if we do admire the fine cocoonery of M. de Grimaudet we cannot recommend it as a model to be followed. Instead of two immense cocooneries which touch each other and are united at right angles, each of which can contain the worms proceeding from 80 ounces of eggs, from which 3 or 4 millions of worms must be produced, we should have been better satisfied if he had distributed in several parts of his property from 8 to 10 cocooneries, in each of which from 15 to 20 ounces of eggs could have been deposited. Until now, experience has shown that the rearings effected in small apartments have always succeeded better than those undertaken in large rooms.

M. de Grimaudet it is true has adapted to his cocoonery the fine ventilating apparatus of M. d'Arcet which succeeded so well in 1835 at M. C. Beauvais', but is it not to be feared that this apparatus, excellent as it may be, might be insufficient when applied to too large a room, in which an immense quantity of worms, several millions for example, will be assembled, thereby insuring its merits as applicable to cocooneries of smaller proportions?

The worms fed in small secluded cocooneries could be preserved from disease more easily than in those of larger dimensions, and if situated some distance from one another the contagion could not spread, but would be confined to the one in which the disease originated. We cannot therefore approve of the vast and splendid cocoonery of M. de Grimaudet, and fear that his system of building may prove fatal to an enterprise to which we so strongly wish success. That which M. de Grimaudet made in Villemomble in 1835 he repeated near Versailles in 1836. In the course of the last year he caused to be erected at the gate of that town, near the gates of Montreuil a new and splendid cocoonery 120 feet in length, 27 feet in width, and 18 feet in height. It is his intention to rear therein the worms produced from 120 ounces of eggs, and in order to provide food for such a great number he has already commenced near his buildings a plantation of mulberry trees of several acres.

The 2d of July we visited the cocoonery of M. Christophe, in Vigneux, but the worms had already spun, and the cocoons were of an excellent quality.—We remarked particularly at his establishment several cocoons produced from worms which we were assured had been fed, during the first fifteen days of their existence, with lettuce leaves. We mention this, but cannot vouch for it as a fact—but if, by new experiments, it could be confirmed, it would prove of some importance.

Upon every side efforts are making to extend in different parts of France the culture of the mulberry tree and the rearing of the silk worm, which, formerly, many persons thought belonged exclusively to the southern provinces of France. Not only have all the experiments made in the neighborhood of Paris succeeded, but the products have, in general, surpassed those obtained at the south.

These happy results are owing to the high state of perfection to which the northern rearers have brought the mode of rearing the silk worm, and principally to the application of the apparatus of ventilation to the cocooneries invented by M. d'Arcet. A few years more and the north of

France will realise immense profits from this new industry.

The neighborhood of Paris produces already the handsomest silk in the world as regards whiteness, fineness of texture, and elasticity. We must now apply ourselves to its regularity and its production on a large scale. The profits of this new production are enormous, but it requires a knowledge and attention which are met with only among learned and enlightened proprietors. That branch of industry never prospered in the hands of a proprietor averse to innovations or improvements. This circumstance is authenticated by the bad silks produced in Touraine and Provence.

It must also be remarked that the countries which have raised silk for the longest time, such as China, Persia, Turkey, &c., are also those that are the most averse to improvements, and consequently they now produce the worst silks; such as sells from 50 to 70 per cent. under the Italian and French silks.

THE MODEL FILATURE AT PHILADELPHIA.

From the Journal of the American Silk Society.

The results obtained by the establishment of this filature, have been so gratifying to those who are immediately connected with the company, that some notice of them may be interesting to your readers, to whom you have made our establishment familiar, copying our brief prospectus into your last number. Our capital is \$20,000, in shares of \$20 each, and we operate under a charter obtained from the governor of Pennsylvania, whom a general law of the state authorizes to issue letters patent, under certain limitations, for the incorporation of persons embarking in the silk business. Under this law charters are obtained directly from the governor, without the trouble and delay of an application to the legislature. The whole expense is the fee of \$4, required at the secretary of state's office. A limited amount of stock was sold, and only \$5 per share required to be paid: a principal object with us being to get the filature into actual operation, no matter in how humble a way. The necessary apparatus being obtained, advertisements were extensively published, and are yet continued, offering to purchase at fair prices, all the sound or pierced cocoons that might be brought to us. Numerous lots, from Tennessee, Virginia, Pennsylvania, and New Jersey, very soon came in, and the cash was paid for the whole, to such as were willing to sell. At present, the supply seems to have entirely ceased, and will probably not revive until the new crop is ready.

Among the cocoons purchased by the directors were some very small lots of half a bushel up to two bushels, raised in New Jersey by indigent and aged females, and some by little boys in this city. Four dollars per bushel was the highest price awarded to any; but it would be difficult to convey to you an idea of the gratification and delight which the prompt payment of the money afforded to these persons. Every one expressed himself fully satisfied with the price, some said it was quite as much as they expected; and many were encouraged to go on, and double or treble their crops the present year.

We are satisfied the happiest effects have been produced upon the public mind, by even the limited exertions we have been able to make. We have three Piedmontese reels, and six to eight females employed in preparing the pierced cocoons by removing the shell of the chrysalis, boiling the cocoons, and spinning them into yarn, which is afterwards converted into thread for knitting or weaving. The spinning is performed on a common spinning-wheel, and the whole process is carried on at the filature.

A young lady, who volunteered as a reeler, has been, at the time this is written, engaged about three weeks in reeling cocoons. She has been working on a lot from Tennessee, which are probably as indifferent a lot as could be produced. They are very small, covered with a superabundance of floss, very sharp pointed at the ends, and possess no merit but that of reeling freely. They have evidently been made by sickly worms; yet a bushel of these indifferent cocoons when flossed, affords three-quarters of a pound of silk, as ascertained by actual measurement and weight. No sort of doubt exists with us, that if we could only obtain good cocoons, that a full pound and a quarter would be the product of a bushel. But no good ones have been offered to us. This young lady, after three weeks' practice, reels three-quarters of a pound of silk daily, (about 30 to 40 fibres to a thread,) and for all of her reeling during the first ten days, we have been voluntarily offered \$5 50 per pound cash, and have sold it at that price. Her subsequent reeling has been sold for \$6 cash; and that price may be guaranteed for all we can produce, if it were a ton every week. The causes which have led to the present depression in business of all kinds—the scarcity of money, and the low prices to which all staple articles have receded—have had no effect upon the price of either raw silk or sewing silk. Six dollars per pound may be depended on for raw silk well reeled, and ten dollars for all good sewing silk. A girl, after two months' practice, if ordinarily attentive and ambitious to excel, will reel one pound daily without any extra labor, during the usual working hours.

Our filature is visited daily by strangers from all parts of the Union, and the various operations of reeling, spinning, &c. actually going on, afford abundant gratification to all. Care is taken to explain to such the particulars of the various processes, and to answer the multitude of inquiries made by every stranger who visits us. This office, in the absence of the directors, (to whom the sole conduct is entrusted by the charter,) is performed by Mrs. H. McLanahan, the superintendent. This lady is eminently qualified, by a practical knowledge of all the branches of the silk business, to be the efficient head of such an establishment. A case is also shown, containing samples of silk reeled by this lady, of a quality so exquisitely fine, as to be worth \$12 per pound; together with many other specimens of her superior skill.

A small pamphlet has been prepared, containing a sketch of the objects of the association, with the charter and by-laws, and 2,000 copies were printed for gratuitous distribution, 1,000 of which were immediately distributed by mail to persons interested in the silk-business, in various parts of the country. Copies of this pamphlet are

given to strangers who visit the establishment. The directors have been surprised to observe that so small a quantity of cocoons has been offered for sale, though they have taken so much pains to apprise the public of their readiness to buy for cash. The new crop, however, may soon be expected to come in, as large quantities of worms are already hatched out in this vicinity, and if ordinary success attend the growers, some very heavy crops will be realized, besides many smaller ones. When good cocoons come in, our operations may be expected to go on much more to our satisfaction than at present.

We believe the business of buying cocoons and reeling the silk for immediate sale in its raw state, to be a profitable business of itself, whether carried on by companies or individuals. By the latter, no doubt, a greater profit will be secured, as all individual enterprises are carried on with more economy, tact, and skill, than those of a company. Cocoons of good quality can be reeled for about seventy-five cents per bushel, affording one pound of silk worth \$6. Hence, if \$4 be paid for them, there will be a clear profit of \$1 25 per bushel; and as a girl (with a child at \$1 weekly, to turn the reel,) can reel a bushel daily, ten such girls, if constantly employed on good cocoons, would realize to the proprietor of a filature of ten reels, a gain of \$12 50 daily, from which the slight charges of rent and fuel, are to be deducted. A capital of \$300 would start such a filature, as the silk can be sold for each daily or weekly, according to the wants of the proprietor. As so small a capital is sufficient to secure so important an aid to the silk business, the friends of the cause should assemble and establish small filatures in New York, Baltimore, Richmond, Norfolk, Pittsburg, Lancaster, Cincinnati, Wilmington, Burlington and other principal towns, for the immediate purchase of the new crop of cocoons. We are satisfied no measure could possibly be adopted, which would so certainly place the whole business on a solid foundation, and strengthen the confidence of those now half-way inclined to undertake it.

Care must be taken in purchasing cocoons. Some are rendered utterly unfit for reeling by being scorched in curing them. Others are made equally worthless by suffering fermentation to take place in them, from not drying them sufficiently after curing, if cured by steaming. A little practice will enable a girl to detect imperfections of this kind in cocoons offered for sale—but, perhaps, in estimating expenses, some allowance should be made for loss in buying bad cocoons. There has been quite a demand in this city during the spring, for females who understand rearing worms and reeling cocoons, and a sufficient number could not be found to supply it.

Among the reels at the model filature, is one imported direct from Piedmont a few years since. Though built in an apparently clumsy and lumbering style, both as regards the timber and the workmanship, yet when the silk reeled upon it is compared with that produced on those American reels which are called *improvements* on the Piedmont machine, the difference in favor of the former is so manifest as to place its superiority beyond all question. The silk is certainly possessed of greater lustre; it is more readily cleared of knots and burrs, and it is laid on the aspel in a different

sized skein. The great strength of the aspel maintains a uniform tension in the skein as it is drying, and to this we doubt not the superior lustre is owing. The shrinking of a half day's reeling, broke two aspels of an American reel, showing how necessary it is for the aspel to be strong enough to maintain the silk of uniform tension until perfectly dry. This reel will be used as a model for all others intended for the use of this filature, and variations in the others now on hand, will be changed so as to conform to that from Piedmont. We think the possession of the real Piedmontese reel, almost indispensable to all producers of raw silk. The art of reeling is not by any means so difficult as foreign writers assert. A girl who has any real desire to learn, can reel half a pound daily after a month's practice, and a whole pound at the end of another month. Females will be received at the model filature, and instructed in the art of reeling, without any other charge than the simple obligation to remain three months at the establishment; at the end of which time, if found competent, a certificate of their proficiency will be given to them by the directors.

Further particulars of our operations will be forwarded to you from time to time, if you consider the information desirable for your readers. M.

Philadelphia, May 4, 1840.

DIFFERENT SOILS IN KENTUCKY, AND THE CONJECTURED FORMATION OF THE RICH LANDS AROUND LEXINGTON.

From the Franklin Farmer.

The success of the agriculturist depends not only on industry, judicious rotation of crops, manuring, and the adaptation of the mode of cultivation to the nature of vegetables and their modes of growth, but on the nature of the soil and its consequent peculiar fitness for crops of one kind rather than of another. Hence, some knowledge of chemistry, mineralogy and geology, enables the tiller of the soil to derive greater resources from his capital and to avoid great disappointment in the investment of capital and in the cultivation of crops not suitable to the soil.

Some stock raisers of Bourbon and Clarke, raised on the *calcareous lands* of these counties, so finely adapted to grasses, (endogenous glumaceous plants, of which the *poa* tribe, including the greensward or blue grass is so valuable, and not the exogenous, leguminous plants, including the *trifolium pratense repens*, &c., red and white clover, which latter grow very well on *silicious soils* if rich,) who have bought lands in the *sandstone region* with the expectation of having fine grass pastures, will be greatly disappointed. They will find that the *silicious soil*, although rendered black and apparently as rich as the Bourbon land, by the decay of vegetable matter mingling with the iron washed down from the hills, is not adapted to *greensward pasturage*. They will succeed better with corn and clover, and still better with the mulberries for silk and the grape vines for wine. But for these branches of national industry they are not prepared. They would do well therefore to fix themselves on *calcareous lands*, and leave the sandstone lands to others. Until the mulberry and the vine shall become parts of our agricultural

system, the lands in the sandstone region will be most probably devoted to the raising of Indian corn, oats and leguminous crops. All these crops will, I presume, be easily disposed of in feeding hogs, and after a geological survey of this commonwealth, in supplying iron smelters and colliers and those connected with them, who will constitute a considerable population in that part of the state least favorable to agricultural purposes generally, and to graziers particularly. Although in speaking of Kentucky, we say it is a limestone country, this expression is to be taken with much limitation. The superficial stratum on which the farmer has to operate, in a large portion of the state, is not calcareous, and if the substratum is limestone it is overwhelmed by the detritus of sandstone and iron ore. It is true, that the limestone occasionally outcrops among the hills, but it does not give character to the soil. It is well known that the nature of the rocks of the country is a sure index of the nature of the soil in a great portion formed from them. By determining therefore, the lines of demarcation pursued by the superficial rocks, we have sure indications of the nature of the soil on the lands below them, *except on the alluvions of the streams*. On these we find the disintegrated materials of the lands from which they flow mingled with the stone and soil of the immediate neighborhood. Thus, on the alluvial bottoms of Licking and Kentucky rivers, we find the sand and fragments of sandstone, iron ore, shale, coal and conglomerate, carried down from the counties of Pike, Estill, Clay, Perry and Floyd, and deposited in the river bottoms in the counties below, in the soil essentially calcareous, carried from the neighboring lands. The alluvial bottoms, therefore, on the streams passing down from the mountainous country of sandstone, iron and coal, through calcareous lands, lower down, partake of the character of both regions, while the bottoms on the smaller streams, not extending into the highlands, are not of so mixed a consistence. With the exception of such alluvial lands, the lines of rock enable us to speak with sufficient precision of the nature of the soil. In passing from Frankfort, eastward, between Paris and Winchester, and in the direction of Mount Sterling, we find no rock *in place* but limestone, intersected by occasional veins of lead ore, and one, I think, of sulphate of barytes, until we get four or five miles east of Winchester. Here we arrive at the first range of sandstone, alternating with the limestone, and this range runs north-east and south-west across from the Kentucky river to Licking, very nearly parallel to the Cumberland mountain, where it constitutes the boundary of Harlan and Floyd counties. Whether it extends further than these streams, or changes its direction beyond them, I do not know from personal observation; at this line, commences a great change in the soil. Until we arrive at it, the soil may be considered essentially a calcareous and aluminous earth, enriched by decayed vegetable matter, and colored by oxide of iron. North-eastward and south-westward of this line, for a few miles, the soil is of a mixed character, gradually partaking less of lime, and more of sand, till the high hills begin to appear, then the change is complete, the limestone soil being overlaid and deeply covered by the debris from the sand and ironstone hills, which are flanked by mural escarpments and precipices of

considerable height. These afford sublime and picturesque views to men, and places of retreat to bears and wolves. In these hills, are found beds of iron ore, and beneath them, stone coal outcropping in the ravines from beneath the shale and sandstone, and indicating their existence for miles below their position, by fragments carried down by the water. Here the blackberry, the hazle and the whortleberry, the ivy or calico-bush, and the *kalmia latiflora* usurp the possession of the earth, while the pine, the cedar, and the cypress invade the heavens above, and indicate a change of climate as well as of soil. They all combine to admonish the farmer to respect their natural rights, and wage no unequal war with them for the possession of the soil which would but poorly pay the expenses of the conquest. While to the miner, the mineralogist, and the florist, these hills and precipices and deep ravines offer the most attractive objects. To the state at large, there is no subject of greater interest, nor one which promises more useful results to her permanent prosperity, than a geological survey of her territory.

As to the causes which have produced that surpassingly beautiful and fertile *basin of land* lying between Licking and Kentucky rivers, of which the sandstone region above Winchester is the upper boundary, and the hills of Franklin, Owen, Grant, Scott and Harrison, the lower, we can only conjecture. It has received various names, such as the garden of Kentucky; the Elkhorn Paradise, &c. It is the "dark and bloody ground" for the possession of which, the Indians so long contended with the "Long Knives." It was well worth the winning. For a fairer land "the sun never shone upon." Its central point of depression has never been ascertained, I believe, by surveyor, geologist or engineer. It is drained principally by North and South Elkhorn, which unite a few miles from Frankfort, and carry the superfluous water of this basin into Kentucky river. The soil is generally of a dark chocolate color, lighter or rather redder on the higher grounds and darker in the lower, except the mere superficies, which is very dark, in some places black. The causes we shall allude to hereafter. The rock of the substratum, at the distance of from three to ten feet below the surface, is blue limestone, in horizontal strata, imbedding numberless shells.

Still lower, we meet with harder limestone, capable of receiving a good polish, called "Kentucky marble," of which tombstones, &c. are made. The rock on the surface, and interposed among the soil, is apparently newly formed limestone, containing many shells and petrifications. It is of a lighter color, and in much thinner layers than the blue limestone. Many specimens bear a strong analogy to the tufa or travertine of Italy. It is very friable, and its disintegration by rain and frost is very rapid. In descending hills and approaching the streams we meet with it throughout the whole basin. It forms steps and benches across the roads, rendering them bad for wheel carriages, and rough even to the traveller on horseback.

Of the forest trees, all of which have been enumerated and described by others, none in this region seem to be *very old*. There is no "cedar of Lebanon" among them. The sycamore or button wood, poplar, (*lyriodendron tulipifera*), burr oak, walnut and ash, have attained the greatest size. As all of these are exogenous, consequent-

ly their age is easily ascertained, from the concentric rings indicating the growth of each year. I have examined some of these, apparently as old as any, and their age does not exceed three hundred and fifty years. In speaking of the soil, I should have mentioned that about five and a half miles below Winchester, there are a number of fragments of light sandstone, from the size of a man's hand to that of his head, and some larger still, and that throughout the whole basin, broken pieces of flint, from the size of a gun flint to that of an iron pound weight, are to be found on the hill sides and in the streams, on the surface and near it, and that what is called shot iron ore, is disseminated every where in the soil, and abounds most in low concavities where the soil is blackest. The nearest range of flint stone in place, that I have seen, is in Montgomery, beyond or eastward of Mount Sterling.

The relative situation of the high lands, east of this remarkable basin, of the rivers, on its flanks, of the hills below it, the appearance of its exterior edges on the upper side, denuded of soil and presenting an inclined rock-covered surface, with the stratified rocks of recent formation, and the rich deposit of soil having on and near its surface, fragments of the rock formation above, mingled with the soil, induce me to hazard a conjecture as to the former condition of this country.

If, as it has been supposed, the vast area between the Alleghany and the Rocky mountains was once an inland sea, which has been drained off by the rivers running into the Gulfs of Mexico and St. Lawrence, and the Lakes Superior, Michigan, Erie, &c. are *lower basins* of the same, not yet emptied by these channels, which, as their beds become lower by the attrition of the waters, will ultimately reach these remaining lakes, and drain off their waters, leaving their rich basins dry land, this operation may have been, and indeed must have been completed in regard to all the rich basins of land within that area which are now dry land. No person can, I think, visit the falls of Niagara, and examine the river and its banks, from the falls to Queenstown, without arriving at the conclusion that the falls were once at Queenstown, seven miles below the falls. An advance of the falls, twenty five miles up the river, will bring them to Lake Erie. That rapids similar to those now above the falls, will precede them in their advance towards the lake, will hardly be doubted, and that, therefore, the lake will not be suddenly, but gradually emptied. Indeed, the nature of the rock formation on the Niagara, leads to the formation of inclined planes first, by the passage of water over it. Limestone constitutes the bed of the stream overlaying the shale. This is softer than the limestone, and as it is washed out from beneath the lower edge of every break in the harder limestone, the latter, at its lower edge, is pressed down into the cavity below, while the upper portion of the same stratum rests upon the shale, as yet undisturbed by the action of the water. The bottom of a lake drained off, and remaining dry some three or four hundred years, in the position of the country around Lexington, between the Licking and Kentucky rivers, would present just such appearances as are actually presented. I therefore think that the Elkhorn Paradise was once the bottom of a lake of fresh water, holding a great quantity of lime in solution. That

its waters, after producing, by deposition, the newly formed stratified rocks, and leaving on them the soil carried down from its borders, which, mingling with the vegetable matter grown since on this mud and the disintegrated limestone has formed so rich a soil, have passed off by the Licking and Kentucky rivers, cutting down their channels to the hard Kentucky marble. That in the passage of the waters from the east the fragments of sandstone and flint have been brought down into this basin from their places above, and that the minute particles of iron ore washed down, have given color to the soil, making it blackest where there is most vegetable matter; that some time must have elapsed, after the rupture of the vein of siliceous, in Montgomery, by the passage of the waters before the final draining of the lake, seems to be proved by deposits of limestone around fragments of flint. Some of these very soft limestones, encircling pieces of flint which jut out above the surface of the limestone, are two or three inches thick. Very few water-worn pebbles of quartz are to be found in this basin, except in the alluvions of Licking and Kentucky rivers. In the wide deposit of sand between Licking and Slate rivers, they are very abundant, and in the sandy talus westward of the mountains, in Estill county. That there are few pebbles, so little sand and sandstone here, I attribute to the high range of land running across from Kentucky river to Licking, which turned aside these rivers from the centre of the lake, and caused them to drain it by its flanks; the deep ravines leading laterally from it into Licking and Kentucky rivers, favor this supposition. I am told that the high range of land mentioned above, is at some points, (Owingsville for instance,) more than five hundred feet higher than the land at the mouth of Big Sandy river, on the Ohio. The admirable adaptation of the soil of this portion of Kentucky, to crops of grain, grass and hemp, is well known. It is thought by many experienced farmers to be comparatively cheap, even at its present prices, (from \$50 to \$80 per acre,) and certain it is, that after the exhaustion produced by many years' successive cultivation of the same crop, it recovers its original fertility with wonderful celerity. The *return of vegetable matter* to it by clover, for a few years, or rye fed down on the land to stock turned on it when ripe, or even by covering it into timothy meadow, restores it to a condition suitable to crops requiring the richest lands to produce them. It is not to be wondered at then, that the Kentuckians occasionally overstock their markets with agricultural products much in demand. Those who own and cultivate farms in this basin, before they exchange them for other lands in Kentucky, or further westward, will act wisely not to depend on the mere appearance of the soil, but to ascertain its nature and composition before they buy. Otherwise, they may find it illy adapted to their purposes, and be much disappointed in the result of their operations.

JOHN LEWIS.

Llangollen, Franklin Co., }
August 29th, 1837. }

ON SHOEING HORSES.

From the Franklin Farmer.

Nothing engenders so frightful a chain of diseases in a horse, all tending to disable him, as improper treatment of the animal's feet.—Nature had never taken greater pains to form an exquisite anatomical specimen of mechanical power than when it formed the foot of the horse; and to this beautiful, delicate, and complicated formation, does he owe his power of speed over most others of the brute creation. In a state of nature, the horse's foot is seldom, if ever, diseased; in a state of domesticity it is more or less unsound, in seven cases out of ten.—In a state of nature, the foot, being unencumbered by a shoe, is not prevented from assuming that position on the ground which keeps it in a sound condition, and enables each of its component parts to discharge their several functions. In a state of domesticity, the animal is obliged to wear a shoe, for the purpose of protecting its hoof from the roughness of harsh roads; and this shoe is generally so constructed as to inflict considerable injury upon the foot, by incapacitating its several component parts from performing their functions, thereby producing a state of disease. Contracted hoof, sand-cracks, thrush, grease, stiffness in the flexor tendon of the leg, weakness in the pastern and knee joints, and a tendency to genuflexion, are some among the various disturbances produced by improperly shoeing a horse, so as to impede any of the necessary actions of the foot. And yet most of the London farriers, totally ignorant of the anatomy of the horse's foot and of the various uses of its several parts, apply the shoe so as always to produce the effects we have just endeavored to describe.—Having often before observed that we nowhere find such bad horsemanship as in the London parks—we may here add, that whenever we see an awkward fellow gallop by, riding upon his curb, and allowing his snaffle rein to hang loosely up the horse's neck, we are sure, on further examination, to find the poor animal suffering from bad shoeing, ignorance in riding seems always the concomitant of ignorance in treatment of the horse; and he who takes no trouble to learn to do the former with the least possible inconvenience to the animal, will pay little or no attention to the latter.

One of the most important organs of the foot of a horse is that portion which every body knows under the designation of the frog. Upon the health of this organ depends that of the whole foot; and yet the ignorant farrier seems to have conceived so violent an antipathy to this frog, that he always endeavors to cut as much of it away as he possibly can, without actually wounding the animal; and as from the mode of shoeing generally adopted a great portion of the frog is often dried up and decayed, the blacksmith finds no great difficulty in paring it away to almost nothing. The consequence of this we shall endeavor to explain, by describing the use of the frog.

This organ is seated at the heel just beneath the hoof, and behind its bars. It forms a sort of case for the end of the flexor tendon, which it covers like a bulb. It likewise secretes an unctuous liquor which serves to keep the horn of the hoof moist and to prevent it from cracking. The frog is also an elastic wedge, which contracts and ex-

pands with the hoof, and when this wedge receives its due pressure as the animal walks, it keeps the bars in their proper state of expansion and counteracts any tendency in the hoof to permanent contraction.—Thus, then, its functions are indispensable to keep the foot sound; for if it were destroyed, the bottom of the flexor tendon of the leg would be exposed to disease; again, if it did not secrete oil to keep the hoof moist, the latter would crack; as is often the case, lastly, if it were dried up and deprived of its elastic power, the foot would become permanently contracted, and the horse lame, which is a matter of very common occurrence.

Two things are evident from what we have just stated.—1. The secretion, elasticity, and mechanical action of the frog, are absolutely necessary to keep the foot of the horse in a sound state. 2. If, from improperly placing the shoe, or from any other cause, the frog should be deprived of the stimulus necessary to enable it to carry on its natural action, the foot must fall into a state of disease. With reference to this latter, from the position of the foot, and the resources provided by nature, it can occur but very seldom that any accidental cause deprives the frog of its power of action; and as it is an undoubted fact that the shoe, when improperly put on (as it is in seven cases out of ten) produces this effect, by raising the heel and preventing the frog from receiving the slightest pressure—and the necessary pressure can alone give the proper stimulus—it is reasonable to conclude that, in most cases of diseased feet in horses the diseased action is the effect of bad shoeing.

If the farrier would observe the horse in a state of nature,—if he would examine the yet unbroken, and consequently unshodden colt, he would find that the broad, circular foot presses fully on the ground, the frog receiving as the animal walks, at each elastic rebound caused by the play of the pastern, a slight pressure against the ground, which excites it, keeps it in healthy action, and indeed preserves the whole foot from disease. He would also perceive, after a more minute observation, not only is the frog an elastic body, but that the hoof itself, though a horny substance, is elastic, and that it contracts and expands by the action of the muscles of the sensible foot, of which it is only the case or covering, preserving it from injury, but yielding to all its impulses. He would then, if he were not a dolt reason upon what he had observed, and infer that for a horse to be sound upon its feet, it must walk in that exact position which nature designed for it; and that any deviation from that position is unnatural, and deprives the horse of a portion of his power. He would also think that nature, by placing the animal firmly on his heels, and not on the front edge of its hoof, as most horses stand when improperly shod, did so for some wise purpose, and that the slight blows given to the frog as the animal walked, were not without an object, and therefore ought to be continued even when the shoes were on,—unless, indeed he had the presumption, like the be-breeched and be-booted louts in London livery stables, to fancy that he new better than nature. He would at last conclude that the shoe ought to be made to fit the horse's foot, as shoes of Christian folks are made, not the foot pared and burned down to fit the shoe; and that in fitting

on the latter, idiosyncrasies (dear reader, excuse the term) must be as fully attended to as would be done by the fashionable boot-maker in Regent street, when taking account of bunions and other peculiarities on the feet, of one of his fashionable customers.

Unhappily for the poor horses, there are but few observing farriers in London, for there are too many cockneys who ride in the park on their curb rein, and know nothing of the habits or comforts of the poor animal they bestride, to allow farriers time for improvement in their craft; and as we have before observed the oracular sayings of ignorant grooms being received in preference to the dicta of men of information, there is no encouragement held out to those who would otherwise devote their time and energies to the question.

It is much to be desired that a shoe were invented which should have the faculty of yielding to the different impressions which the hoof would impart to it through its elastic action, which action, however, is but slight. In applying a hard, unyielding iron shoe to a horny substance which gently contracts and expands during the action of walking, a degree of inconvenience must always be felt by the animal; but this inconvenience is greatly increased when the natural position of the foot is altered. It becomes, therefore, a matter of vital importance to the well-being of the animal that the shoe should be so formed and fastened on as to allow that action to continue unimpeded which nature has imparted to the horse's foot. For this purpose we offer the following directions, hoping that, as we have called the attention of our readers to the subject, they will give it their earnest attention.

The horse's foot being circular, and not oval, the shoe should be made in that form; or rather the hoof should be measured, and the shoe made exactly to correspond. An oval or elliptic foot is generally, nay, we may say always, diseased. It has assumed that shape in consequence of the contraction of the bars, brought on solely by a diseased state of the frog for want of pressure; and in no one instance of oval formed feet will the frogs be found healthy. The moment the foot is lifted from the ground, the smell indicates the diseased frog, though perhaps cockney equestrians consider this the natural perfume of the organ when in health.

The shoe should be as light as possible consistently with the labor the animal has to undergo. Before it is put on, the hoof should be pared away towards the heels, in such a manner that with the shoe the horse should stand with the frog close to the ground, as when in a state of nature; when the shoe is on, it should be filed away towards the heels, being left sufficiently thick to enable the frog in the natural position of the animal without a rider or burthen, just to clear the ground; so that when the horse bears its burthen or its rider, the frog of the shod foot should receive the same pressure from the ground that it would do if the shoes were taken off and the animal turned loose. When a horse is shod according to the present system, besides the various diseases brought on by the want of the action of the frog, the animal walks upon its toes, (the expression cannot be misunderstood,) and the proper muscular action of the foot and leg is perverted. Hence many horses fall dead lame without the farrier being able

to assign any cause for it, although he will talk dogmatically enough on the subject to confound those who know no better than himself.

HARVESTING OF CORN.

From the Franklin Farmer.

As the season is approaching in which the farmers will commence the securing the abundant crop of corn with which a bountiful Providence has blessed our country, it may be pertinent to the occasion to offer a few remarks upon the best mode of harvesting the crop.

Our Virginia ancestors, and those who think it wise to plant and cultivate and gather as our fathers have done, pursue the old method; about this time they gather the blades below the ears of corn—after they consider the corn to be ripe, they top the stalks and secure all of the fodder in stacks for winter use. In November they pull the corn and remove it to cribs, where it is husked out at leisure. This mode is rapidly yielding in the stock districts to that first introduced among the graziers on the south branch of the Potomac. The farmers in the northern and middle districts of Kentucky, and in the Scioto valley of Ohio, have generally adopted this latter mode; which is to cut the stalks, corn fodder and all, and place them in shocks commonly embracing 16 hills square.

I have seen the richest crops of many climates gathered, and there is no operation in husbandry so animating as that of cutting corn in the mode just mentioned. It is a most cheering prospect to see 20 acres of corn pass in one or two days to a condition in which it is prepared to keep in the field throughout the winter. This remark is predicated particularly upon the plan of riddling the squares, instead of cutting the whole square at once. It will readily occur to any observing mind, that as corn does not ripen with precise regularity, if the entire square is cut at once, some of the corn will mould and sometimes even the fodder will be affected, if the cutting shall be followed by warm or wet weather. To avoid this contingency some graziers commence with the process of riddling, that is, they select only such part of the 16 hills square as may be ripe—go through the field in this way and in 10 days complete the cutting of the square. By this process several important advantages are obtained—the greatest amount of fodder is secured, consistently with the paramount object of saving the corn, and a nucleus for the shock being formed by the first cutting in the square, the shock becomes settled and stands better during the winter. In the rich counties of Clarke and Bourbon, they sometimes cut half of the square on one side and then in ten days finish it. Whilst many graziers in Fayette, Lincoln and Shelby, prefer the process of riddling.

In the course of October and November, these shocks are shucked out, the corn placed in cribs and two of the shocks placed together, or one placed upon the ground and two others put around it.

It is the opinion of practical farmers, that the practice of cutting corn in this mode secures the greatest amount of corn and fodder with the least expense, and is decidedly an improvement on the old Virginia plan, more especially when applied to the feeding of cattle or mules.

T.

DIRECTIONS FOR CLEARING LAND.

From the Encyclopædia Americana.

Take a view of all large trees, and see which way they may be felled for the greatest number of small trees to be felled along-side or on them. After felling the large trees, only lop down their limbs; but all such as are felled near them should be cut in suitable lengths for two men to roll and pile about the large trees, by which means they may be nearly all burned up, without cutting into lengths, or the expense of a strong team, to draw them together. 2d. Fell all the other trees parallel and cut them into suitable lengths; that they may be readily rolled together without a team, always cutting the largest trees first, that the smallest may be loose on the top, to feed the fires. 3d. On hill-sides, fell the timber in a level direction; then the logs will roll together; but if the trees are felled down hill, all the logs must be turned round before they can be rolled, and there will be stumps in the way. 4th. By following these directions, two men may readily heap and burn most of the timber, without requiring any team; and perhaps the brands and the remains of the log-heaps may all be wanted to burn up the old fallen trees. After proceeding as directed, the ground will be clear for a team and sled to draw the remains of the heaps where they may be wanted round the old logs. Never attempt either to chop or draw a large log, until the size and weight are reduced by fire. The more fire-heaps there are made on the clearing, the better, particularly about the old logs, where there is rotten wood. The best time of the year to fell the timber in a great measure depends on the season's being wet or dry. Most people prefer having it felled in the month of June, when the leaves are of full size. Then, by spreading the leaves and brush over the ground (for they should not be heaped,) if there should be a very dry time the next May, fire may be turned through it, and will burn the leaves, limbs and top of the ground; so that a very good crop of Indian corn and pumpkins may be raised among the logs by hoeing. After these crops come off, the land may be cleared and sowed late, with rye and timothy grass, or with oats and timothy in the spring. If what is called a *good burn* cannot be had in May, keep the fire out until some very dry time in July or August; then clear off the land, and sow wheat or rye and timothy, harrowing several times, both before and after sowing; for, after the fire has been over the ground, the seed of timothy should be introduced as soon as the other crops will admit, to prevent briers, alders, fire-cherries, &c. from springing up from such seeds as were not consumed by the fire. The timothy should stand four or five years, either for mowing or pasture, until the small roots of the forest trees are rotten; then it may be ploughed; and the best mode which I have observed is, to plough it very shallow in the autumn; in the spring, cross-plough it deeper, harrow it well, and it will produce a first rate crop of Indian corn and potatoes, and, the next season, the largest and best crop of flax that I have ever seen, and be in order to cultivate with any kinds of grain, or to lay down again with grass. These directions are to be understood as applying to what are generally called *beech lands*, and the chopping may be done any time in the winter, when the snow is not too

deep to cut low stumps, as the leaves are then on the ground. By leaving the brush spread abroad, I have known such winter choppings to burn as well in a dry time in August as that which had been cut the summer before.

THE BEE-MOTH.

From the Franklin Farmer.

Mr. Editor.—Having had some experience in the management of bees for several years past during a part of which time my apiary has comprised twenty hives; and having been a close observer of the bee-moth ever since its first appearance in this vicinity, I am induced to present a few facts which I have obtained by close observation, and which may probably assist some of your readers in checking the ravages of these destructive insects.

During the past summer I have kept a number of the maggots and the flies under glass tumblers and small boxes for the purpose of particular observation, and now write with one of each before me.

The moths are butterflies or candle flies of a pale ashy color; and when full grown are about half an inch in length, with reddish backs, small sharp heads, short and delicate horns, and without a proboscis. Their wings are small and double, and when in a state of rest are kept close to the body. During the day they may be found sitting upon the retired parts of the outside of the hives, and may be easily taken with the fingers. About the dusk of evening and morning the females may be seen sitting with their wings extended, inviting the embraces of the males, while others are fitting to and fro, and occasionally one may be seen to dart with great velocity into the entrance of the hive. The bees will not pursue the moths on the wing, and the moths far outstrip them in flight on foot. The moths live about ten or twelve days, during which time I cannot perceive that they take any nourishment whatever. The only object of their existence seems to be to deposit their eggs, which are small, round and white, and of which I have seen ten dropped in rapid succession. For this purpose nature has most skilfully provided them with a *sort of proboscis* about the sixteenth of an inch in length, which is contracted and protruded from their tails, and vibrated with great velocity, as wasps or hornets do their stings, which it somewhat resembles. With this admirable apparatus the eggs are deposited in places which are inaccessible to the bees, or they would be destroyed by a thrifty and a spirited hive. As soon as the young maggot casts its shell, it envelops itself in a web which is closely attached to the hive or stand, and which is impervious to the bees. These webs are enlarged as the maggots grow, and they grow fast and fatten kindly, no matter whether a poplar or pine plank, or honeycomb and its delicious sweets, are the elements upon which they subsist and weave their webs.

From one experiment I am *satisfied* that the maggots will attain their full size of half an inch in length, and the thickness of a large knitting needle, in the short space of eight days: but of this I can speak with greater certainty hereafter, as I now have two lots of eggs under observation.

The maggots have tough, jointed, white skins, and hard oval black heads. They crawl but slowly and rarely venture from under the protection of their webs; though they often pass, like moles, through the centre of a sheet of comb 10 or 15 inches in breadth, making a partial web over each cell in the route. Though the bees cannot, I believe, penetrate the hides of the maggots, either with their teeth or their stings, still they can fight them and carry them out of the hives; and this they will do, when the hive is thrifty and in good spirit. I have often seen a maggot straighten himself and crawl off, apparently unhurt, after having been fought by several bees for many minutes; and I have seen the moths run over the bees and escape out of sight by the time the bees had faced about ready to give them battle.

After a brief existence the maggot gathers his web close around him, becomes inactive, and gradually assumes a harder black shell, which it bursts and is again a fly in about twenty days.

I have been somewhat particular, thinking it important to know the habits and character of the insects, in order to know how to destroy them. I have tried in vain to disgust and drive them from the hive, by the use of turpentine, worm-wood, penny-royal, &c. I have tried confining the hive close to the stand, and plastering up all the crevices with quick lime, and I think the plan with tubes for entrance (which I first saw suggested in an eastern paper) might succeed, did it not require a nicety of material and a precision of construction, which are not within the reach of ordinary bee-masters. After losing two valuable hives by relying upon the closeness of the boxes, I abandoned the plan, and have since tried elevating them upon blocks with better success. The zeal of your esteemed correspondent, J. J. V., for his plan, has led him into an error of which a close look into a thrifty and spirited hive will convince him. He will see the comb surrounded and covered with such dense clusters of bees, as no fly could penetrate: and any moth would conclude that it was far easier, (saying nothing of danger) to lay its eggs in the lower and unguarded corners of the hive than in the more distinct and frequented parts. All my stands have been more or less infested this year, and two which were but partly raised from the stand have been entirely destroyed; and, from daily observation, I am satisfied that the moths invariably, at first, deposit their eggs in the lower parts of the hive, and chiefly, where it sits upon the stand; whence the webs are gradually extended until they reach the comb. The bees then soon relax their industry, lose their spirit, and commence to eat their honey, in which other bees unite, and which may be known by unusual quantities of excrement about the hive. The moths and the maggots are emboldened to greater intrusions; they boldly enter the inmost recesses of the hive, and soon the work of devastation is disgusting and complete. The bees, not having spirit to resent the intrusion, and not being able to prevent it, languish, die, or desert the stand.

In a future number, if you wish, I will give you an account of the plan I have practised during the present season, and which I think most susceptible of general practice and success. * * *

According to promise, I will pursue this subject, with some apprehension lest your editorial note may have induced the belief that I was about to

divulge some mysterious and sovereign specific, for the destruction of these hateful insects. So far from it, the plan, which I at present pursue, is exceedingly simple, and susceptible of universal application; and may not have been practised by me alone, or by me first. But as I tried many unsuccessful experiments, and lost many valuable bee stands, before I adopted this plan, and as it has been quite satisfactory thus far, and it is not generally practised, I cannot refuse to communicate it, according to your request.

A shed should be built with three sides closed tight, and with the other side open to the east, high enough, under the eave, to admit two bee-benches, one above the other, and broad enough to walk freely behind the stands, with a door in one end of the shed for persons to enter it. The boxes should be arranged upon these benches with their entrances outward, so that the bees will be under no temptation or inducement to come behind them.

The boxes should be 20 inches square in the clear, made of thick seasoned plank well put together, with tight joints. The bottom of the box, which sits upon the bench, should be bevelled, from the outside, to a sharp edge. Cross sticks should be put in the box, and notches made for the bees to enter, in the usual manner: and large holes should be bored in the top of the box, to be covered with a cap twelve inches square, bevelled as above, after the box shall be well filled. When the bees begin to work in the spring, the boxes must all be raised upon the blocks put under the corners, high enough to permit the bees to pass freely under them, but not high enough to admit mice. The blocks must be high enough for the box to sit upon them without rocking or slipping. A light, slim wooden paddle should be made, with a handle about eighteen inches in length, and with a short, thin, elastic blade, and should be kept always in the bee house. With this instrument in hand, the bee master must walk behind the benches, and tilt the boxes over from him, look into them and search for, and destroy with the paddle, any flies or maggots which may be found. The house being open only in the front, and the bees being accustomed to fly out only on that side, this operation may be performed with security and at leisure. Indeed it will be a pleasant place, which may be resorted to at any time day or night; and the bee manager, whether male or female, so far from finding it an unpleasant or perilous task, will find it an agreeable and profitable amusement, and will be so much interested with the bees as to visit them too often for the moths to make much progress before they are discovered and destroyed.

If you wish to take some honey, a cap may be removed at any time, an empty one put on the box, and you may retreat through the side door, without the least inconvenience to yourself or interruption to the other bees.

The blocks not only serve to prevent a lodging place for the maggots, but also prevent the bees from being mashed when the box is set down, after being inspected. Nails have been recommended instead of blocks, but the difficulty of inserting and removing them renders them objectionable.

There is no effectual virtue in the nails, or in the blocks, or in the manner or material for making the boxes; or in drugs or liquids to drive the

moths from the hive. *The boxes must be raised up and inspected frequently and carefully, and the moths and maggots killed with the paddle.* This will give but little trouble and much pleasure and profit too, if the bee house is constructed on this plan, and is conveniently situated, so that the bee master can often step in and spend a leisure moment in witnessing and assisting the labors of these his industrious and unhired servants.

For this sort of attention my bees have this year repaid me with over two hundred pounds of delicious honey, and with many new swarms. 'Tis true I have had to inspect them often and kill many moths; and have lost two stands by depending upon the blocks and bees too much and not using the paddle enough. Your friend,

R. W. S.

ON THE CULTIVATION OF FRUIT TREES.

From the Franklin Farmer.

Description of a method of cultivating peach trees, with a view to prevent their premature decay; confirmed by the experience of forty-five years, in Delaware state, and the western parts of Pennsylvania. By Thomas Coulter, Esq. of Bedford county, Pennsylvania.

The death of young peach trees is principally owing to planting, and pruning *the same stock*, which occasions it to be open and tender, with a rough bark, in consequence of which insects lodge and breed in it, and birds search after them, whereby wounds are made, and the gum exudes, and in a few years the tree is useless. To prevent this, transplant your trees as young as possible, if in the kernel it will be no check of growth. Plant them sixteen feet apart. Plough and harrow between them, for two years, without regard to wounding them, but avoid tearing them up by the roots. In the month of March or April, in the third year after transplanting, cut them all off by the ground, plough and harrow among them as before, but with great care, to avoid wounding or tearing them. Suffer all the sprouts or scions to grow, even if they should amount to half a dozen or more, they become bearing trees almost instantaneously, on account of the strength of the root. Allow no animals but hogs to enter your orchard, for fear of their wounding the shoots, as a substance drains away through the least wound, which is essential to the health of the tree, and the good quality of the fruit.

If the old stalk is cut away the third year after transplanting, no more shoots will come to maturity than the old stump can support and nourish, the remainder will die before they bear fruit, and may be cut away, taking care not to wound any other stalk. The sprouts when loaded with fruit will bend, and rest on the ground in every direction for many years, all of them being rooted as if they had been planted, their stock remaining tough, and their bark smooth, for twenty years and upwards. If any of the sprouts from the old stump should happen to split off and die, cut them away, they will be supplied from the ground by others, so that you may have trees from the same for 100 years, as I believe. I have now trees from one to thirty-six years old, all from the same

stump. Young trees, formed in this manner, will bear fruit the second year; but this fruit will not ripen so early as the fruit on the older trees from the same stump. Three years after the trees are cut off, the shoots will be sufficiently large and bushy to shade the ground so as to prevent the growth of grass, that might injure the trees; therefore ploughing will be useless, and may be injurious by wounding them. It is also unnecessary to manure peach trees, the fruit of manured trees is always smaller and inferior to that of trees which are not manured. By manuring you make the peach tree larger, and apparently more flourishing, but its fruit will be of a bad kind, looking as green as the leaves, even when ripe, and later than that of trees which have not been manured. Peach trees never require a rich soil; the poorer the soil the better the fruit; a middling soil produces the most bountiful crop. The highest ground is the best for peach trees, and the north side of the hills the most desirable, as it retards vegetation, and prevents the destructive effects of late frosts, which occur in the month of April, in Pennsylvania. Convinced by long experience of the truth of these observations, the author wishes they may be published for public benefit, and has been informed, that Col. Luther Martin and another gentleman, in the lower part of Maryland, have adopted a similar plan with great advantage.

From the Southern Cabinet.

NOTES ON EUROPEAN AGRICULTURE. BY A CHARLESTONIAN.

The Grasses.

I stated in my first number, that in fine breeds of horses, horned cattle and sheep, suited to the different climates and pastures, Great Britain took the lead of the world. The abundant supply of milk, butter and cheese—her superior mutton, veal and beef—her wool and her unrivaled breeds of horses, are all dependent on the cultivation of various rich grasses—some of them natives, but the majority and the most valuable—exotics, now naturalized and adapted to the soil and climate by long cultivation. England, with her millions of inhabitants dependent on her commerce and manufactures, could not exist without her grains and grasses. With all her wealth, she would be ruined in two years, were she obliged to import her hay and corn, on which the dairy and meat markets are dependent. O'Connell, who seizes every opportunity to speak contemptuously of our country, said in parliament, two years ago, in reference to Americans importing grain from Europe for home consumption, that he had but a poor opinion of an agricultural country that was obliged to import its corn. The improved breeds of cattle in the western parts of Pennsylvania—in Ohio, Kentucky and the Opelousas country, are evidences of what may be effected by the cultivation of grasses. The cattle brought to the Charleston market from Kentucky, will bear a fair comparison with those of England; they are indeed the descendants of imported breeds, and I have noticed that they are yearly improving in form, size and weight. The oxen from Opelousas, in the south-western part of Louisiana, with im-

mense wide spreading horns, like those of the buffalo of Abyssinia, are said to be the descendants of inferior breeds from Mexico. They are now among the largest and finest in the world, and supply with excellent beef the markets of Louisiana, Mississippi and Arkansas. They are especially prized for the team—are used in ploughing, and are said to travel with ease in a wagon at the rate of four miles per hour. To the rich grasses abounding in Kentucky and the Opelousas, must be ascribed the improvement of these breeds of cattle. In Kentucky, the grasses are clover and timothy, or herd's grass, and several species of *panicum*, *poa*, *elymus*, and *digitaria*; the two first have been introduced, and the others are exotics. The grasses in the Opelousas I am not acquainted with; they are evidently natives, and as the climate where they flourish does not differ materially from that of Carolina and Georgia, it would be very important to introduce the seeds and cultivate them in our southern country.

Although it would always be advisable to make experiments on the native grasses of the country, as best adapted to the soil and climate, and affording the fairest prospect of success in their cultivation, yet it must be admitted, that nearly all of the most valuable fruits, grains and grasses, were not originally natives of the countries where they are now most successfully cultivated. The cereal grains and finest fruits were not originally natives even of Europe. The Irish potato is infinitely more productive in the Green Isle than in South America, its native country, where the largest specimens I have seen were not larger than a bean. The rice, sweet potato and cotton plants of Carolina, have a foreign origin; and the clover and timothy, which are more valuable to the northern and western states than all the gold mines in the world, were imported from the east.

It must be admitted, that the maritime districts of Carolina and Georgia, and we might safely include the middle country, and a great portion of Alabama, notwithstanding a fine climate and a moderately good soil, have in reality no pastures. Our crow-foot and crab grasses, although excellent food for cattle, are only annuals, and the fields which produce them require to be ploughed and manured, (a labor which is seldom submitted to;) our hot suns of summer dry the earth and parch up the grasses—little hay is made to feed the cattle through the winter, and they are left to seek a precarious subsistence among the cane-brakes, which, owing to clearings, fires, and other causes, are daily diminishing. Towards spring they remind us of the description Col. Crockett gave us of his neighbors' hunting dogs—"so poor that that they had to lean up against a tree to bark." To give them the pickings of the early brome grass, the woods are set on fire, and away go the flames, destroying the young timber and burning up the rich mould on the surface of the earth, which has been collecting for years—many a panel of fence is burnt up, and many a day is wasted in consequence of having summoned out all the hands on the plantation to light the fire. The grass springs up, it is true, but in that state affects the cattle unfavorably, weakening them by constant purgation, and about the time the cows become mothers they are found in the ditches or in the mire—the flight of the buzzard, and the dogs on the plantation indicating where our treasures

lie hid. I should be happy of an assurance that this is an exaggerated picture of our grazing and farming system, yet whilst I see hay brought in bundles from New England to Charleston, and thence reshipped to Columbia and Camden—whilst I am constantly witnessing our poor and diminutive breed of cattle, and am doing penance on salt butter from New York and New Jersey, I cannot but think that we are sadly deficient in the cultivation of suitable grasses, on which all the prospects of the dairy, the beef market, and the improvement of our soil, depend. It would be fallacious reasoning to argue that our southern country cannot become a grazing country, because we have, as yet, found no native grasses adapted to this purpose. Great Britain was once a sterile country, dependent on its mountains and on its continental neighbors for its butter and meats; at present, with a population increased one hundred fold, it supplies the wants of its inhabitants, thousands of whom derive their whole subsistence from the products of the dairy. The island of Jamaica, which has no productive native grasses, and which formerly imported every pound of butter and beef, has been abundantly supplied with both, by the simple introduction of Guinea grass, a native of Africa. We have in Carolina been so infatuated with the cultivation of cotton and rice, that we have paid but little attention to our native grasses. There are several species that have been undervalued, and others are only known to the botanist. Our Gama grass, (*tripsacum dactyloides*), may have been puffed too highly at one time, but appears now to have fallen below the standard of its real value. I have had a bed of it in my garden for the last ten years; it has never been affected either by our hottest summers or coldest winters—not a root of it has required transplanting, and it is at this moment, if possible, more flourishing than ever. Horses do not relish it in its green state, as it is a coarse grass, but readily eat it when made into hay. Cows and mules are fond of it, and thrive under it. The rice grass (*leersia oryzoides*) succeeds well in very wet soils, but the seeds are difficult to preserve. The hay is equal to that of timothy, but the plant is only adapted to particular kinds of soil, and in dry seasons is an uncertain crop. These grasses, as well as the white clover, are indigenous to our soil, and seeds and plants can be obtained in many portions of our state. We have upwards of two hundred species of grasses indigenous to our southern states, and it will not be presumptuous to say, that some of them may be found well adapted for pasturage and hay. No country has ever been known in which some kinds of grasses for pasturage and hay may not be cultivated with success. If the native grasses are not adapted to the purpose, those of similar kinds in other climates may be advantageously introduced. The plants of China and Japan are known to succeed well in our climate, those of Thibet, Persia, the island of the Mediterranean and Morocco, being in nearly the same latitude, as well as those of portions of South America and New Holland, might be introduced with a prospect of success, and it would be surprising if some among the various grasses that succeed well in these countries might not be equally well adapted to our own soil and climate.

But the cultivation of grasses is not alone es-

essential in affording pasturage and hay, and thereby adding to the comforts of life in providing us with milk, butter, and meats for our tables: they are very important aids in restoring exhausted soils. They are substitutes for manure. Our plantations in the south are so large that with all our industry in collecting leaves and stable manure, not one-half of our fields are ever manured. Hence, our lands in time become exhausted, are thrown out as old fields, and not cultivated again for many years. Some of our planters remove to the west, believing it cheaper to clear new grounds than to restore exhausted ones. In the mean time, they and their families have to undergo many hardships and privations. They are thrown among strangers, severed from the associations of early life, and are deprived of the advantages of society—of schools and churches. Had the same labor been bestowed in renovating their now deserted plantations, that has been used in settling their new farms, they would probably have suffered nothing in fortune and gained much in comfort.

That land may be improved in cultivation without adding stable manure, has been shown by many successful experiments. I have seen lands in Pennsylvania and New York, which are now more productive than they were twenty years ago, and have been continually improving although under cultivation, without the addition of any other manure than the small quantities of plaster of; Paris in which the wheat had been rolled previous to sowing. The wheat was succeeded by a crop of clover: this produced one or two plentiful crops of hay the first year, and was probably pastured the year following. Crops of Indian corn, or potatoes, buckwheat, oats, wheat and clover, succeeded each other: the farmer became every year more comfortable in his circumstances, and felt no desire to leave his kindred and native home in search of an El Dorado in the west.

In my next I will endeavor to enumerate some of the foreign grasses that might be cultivated in our southern country with a probability of success.

Providence has kindly scattered his blessings in due proportion over the earth. He has endowed man with intelligence and industry, to enable him to appropriate to his own use, the various productions in the wide field of nature from which he may derive subsistence and comfort. There is no country so sterile, which man by seizing on the productions around him, may not render subservient to his use, and from which he may not derive a support. The Arab in the desert, and the Esquimaux amidst the ices of the Pole, find a table prepared for them in the wilderness by the bountiful hand of heaven, and by seizing on their advantages, they are fed and clothed and are contented with their lot. The man in civilized society has many artificial wants, but is endowed with greater resources. Science and commerce enable him to bring to light the hidden resources of nature—to profit by the experience of others, and to bring into cultivation the productions of other lands. A beneficent Providence has created various cereal grains, fruits, and grasses, and planted them, perhaps, in some small island—on some obscure spot on this His earthly garden, but has endowed man with intelligence and enterprise to know their value—transplant them into other soils—improve these gifts of nature by cultivation,

and render them invaluable auxiliaries to his comfort and happiness.

The most valuable plants and grains which now engage the industry and minister to the support of three-fourths of the world, are of comparatively recent introduction. Whilst the olive, the millet, and the silk, may be traced back to the ages of antiquity, the articles which now feed and clothe the inhabitants of the civilized world, have been more recently discovered by men of science, and brought into cultivation by the skilful agriculturist. A single generation has only passed away since a handful of rice, and a few seeds of cotton, were sown in a garden in Charleston as a *curious*, and no doubt, regarded by many, as an idle experiment. They are now such important staples, that they engage the commerce, and regulate, in a considerable degree, the monetary system of the world. The Irish potato, which has been of the greatest consequence to mankind, was not known in Europe till the days of Raleigh, and found its way into England by a ship, wrecked on the coast of Lancashire. During the many severe famines to which Great Britain has been subject, there is no exaggeration in asserting that the lives of millions of human beings have been preserved by this vegetable alone. It is but a little more than a century since the first coffee tree was brought to France, from which all the trees in the West-India islands have originated. The original sweet orange tree, from which all the varieties of that fine fruit in Europe and America have been derived, although a native of China, was shown but a few years ago at Lisbon. The writer of this article, has plucked fruit from the original tree, which produces the sickle pear now cultivated both in Europe and America, as the finest variety of this fruit in the world. The tree, he believes, is still growing in one of the meadows in the vicinity of Philadelphia. Nor is it in the power of any government, by its strictest enactments, to prevent the dissemination of fruits, plants, and seeds. If the ingenuity of man cannot accomplish it—the birds, the winds and the waves, will effect it. The cocoa-palm is now growing on the sands of Florida, the nut having been floated from Cuba by the waves of the sea. The sea grape, the shore plum, and more than a hundred other species of West-India plants, not omitting the mahogany, have been carried thither either by the winds or the birds. The white headed pigeon is known to visit Cuba every day, whilst it is breeding along the Florida coast, and thus becomes a courier and a planter between the island and main. The severity of the laws of that exclusive and extraordinary people the Chinese, could not prevent the productions of their soil from finding their way to other lands—nor could the rigor of the Dutch and the burning of their superfluous spice trees prevent the dispersion of their cherished aromatic plants. The tea shrub of China is now cultivated in Java by men smuggled from Japan, and also flourishes in the vicinity of Charleston—and the spice trees have found their way to the islands of the West-Indies and of the Pacific ocean.

The grasses cultivated in Europe, although the majority of them are not indigenous, have now become so thoroughly naturalized that they may be regarded as natives. In laying down lands for hay or pasture a greater mixture of seed is used than in the northern states of our own country.

The grasses most commonly cultivated are red clover, white clover, timothy or herds-grass, rye grass, crested dog's tail grass, vernal grass, trefoil, &c. To this may be added as fodder for cattle various species of vetch—as well as turnips, carrots, the sugar beet, &c. The invaluable herds-grass—our timothy (*Phleum pratense*), was extensively cultivated in this country before its value was known in Europe, and has only of late come into repute in the latter country. I believe in America it received its name from having been brought from New-York to Carolina by Mr. Timothy Hanson. Less merit than this has often conferred immortality on a name.

A successful and extensive farmer in Scotland gave me the following list of grass seeds, and the quantities of each sown on an acre :

Red clover—the variety called Duke of Norfolk's cow-grass, (*Trifolium pratense*.) - 4 lbs.
White clover (*Trifolium Repens*), - 7 “
Rye grass (*Lolium perenne*), - 25 “
Trefoil (*Medicago lupulina*), - 4 “
Sheep's fescue grass (*Festuca ovina*), - ½ “

In England the following table, contained in an article by Lawson on grasses, (Quarterly Journal

of Agriculture, vol. iv.) exhibits the quantity of grass seeds sown to the acre. It will be recollected that the land thus laid down in grass is not intended as a permanent pasture, but to be used for hay and pasture for a year or two and then again cultivated with grain.—

LIGHT AND MEDIUM SOILS.

	One year hay.	One year hay and one year pasture.	One year hay and 2 years pasture.
<i>Lolium perenne</i> ,	18 lbs.	18 lbs.	18 lbs.
<i>Trifolium pratense</i> ,	8 “	6 “	8 “
“ <i>perenne</i> ,	00 “	00 “	3 “
“ <i>repens</i> ,	2 “	4 “	4 “
<i>Medicago lupulina</i> ,	00 “	2 “	2 “

For heavy soils, 1 lb. of *phleum. pratense* and 2 lbs. of *trifolium pratense* are added.

The following table is added from the same author. It may be useful to our northern and up-country farmers, who may be desirous of laying down their lands for meadows or permanent pasturage. I believe this is the mode now generally approved in England.—

	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a crop.	Without a crop.	With a crop.	Without a crop.	With a crop.	Without a crop.
<i>Alopecurus pratensis</i> ,	1 lb.	1½ lb.	1½ lb.	2 lbs.	2 lbs.	2 lbs.
<i>Avena flavescens</i> ,	½ “	½ “	00 “	00 “	00 “	00 “
<i>Dactylis glomerata</i> ,	4 “	5 “	4 “	5 “	4 “	5 “
<i>Festuca duriuscula</i> ,	2 “	2 “	2 “	2 “	1 “	1 “
“ <i>heterophylla</i> ,	00 “	00 “	1 “	1 “	1 “	1 “
“ <i>loliacea</i> ,	00 “	00 “	00 “	00 “	1 “	2 “
“ <i>pratensis</i> ,	1 “	2 “	2 “	3 “	2 “	3 “
“ <i>rubra</i> ,	2 “	2 “	00 “	00 “	00 “	00 “
<i>Lolium perenne</i> ,	10 “	12 “	10 “	12 “	10 “	12 “
<i>Phleum pratense</i> ,	00 “	00 “	1 “	1½ “	2 “	3 “
<i>Poa pratensis</i> ,	1 “	1 “	00 “	00 “	00 “	00 “
“ <i>trivialis</i> ,	00 “	00 “	2 “	2 “	2 “	3 “
<i>Medicago lupulina</i> ,	1 “	1 “	1 “	1 “	1 “	1 “
<i>Trifolium pratense perenne</i> ,	3 “	4 “	3 “	4 “	3 “	4 “
“ <i>repens</i> ,	4 “	5 “	4 “	5 “	4 “	5 “
	29½ “	36 “	31½ “	38½ “	33 “	42 “

And common barley or rye, about one bushel additional to such as are sown without a crop.

In all cases the ground must be ploughed upon sowing the seed. It is scattered broad cast either in March or September, or October, (the autumn month being preferable,) and the ground is harrowed and rolled after sowing. In the northern states of America, clover is frequently sown in the wheat field in early spring, and this is occasionally done with the above mixture in Europe.

In England farmers differ considerably in their estimate of the various species of grass. In the pasturage on the South Downs, where the formations are of a chalky nature the plant called the Burnet (*Poterium sanguisorba*), seems to cover the whole earth, and is greedily eaten by fine sheep that range on those pastures. This plant, which I have never seen in America, was formerly cultivated extensively in England for pasturage, but it has, of late years, given way to other more valued kinds. In the mountains of Switzerland, along the highways between Constance, Zurich

and Berne, and indeed in the whole of the Swiss Alps I noticed the sheep and goats, and even cows, feeding almost exclusively on the rib grass, a species of plantain (*plantago lanceolata*) which I have occasionally seen in America, in the vicinity of cultivated fields, where it was evidently introduced. I was informed by the inhabitants that the fine flavor of their butter and cheese was imparted to them by this plant. The sweet scented vernal grass (*anthoxanthum alpinum*), growing in the same vicinity, may also contribute its aid in this particular. On the hills of Scotland in the vicinity of Loch-Lomond, which, with the exception of their being not wooded, bear some resemblance to the mountains of Virginia, the common native grasses, such as the flat stalk meadow grass (*poa compressa*), crested dog's tail grass (*cynosurus cristatus*), *agrostis canina*, and several other hard species give nourishment to the extensive flocks covering the mountains. The duke of Buccleugh

is the lordly possessor of many of these extensive sheep walks. Thousands of black-faced sheep, the usual varieties of these towering hills, are annually driven to the markets in Edinburgh, Glasgow, &c. To my taste, they produce the finest mutton in Europe. I have often thought that not only these breeds of sheep, but the pastures on which they are fed, might be easily and successfully introduced into the mountainous districts of our country.

In Germany, the common spurry (*spergula arvensis*), is cultivated as a winter pasture for sheep and cattle. It is sown on the stubble after the corn crops are removed. It is said that the mutton, as also the milk and butter of cows, fed on it, are of a very superior quality. There is a distinct variety of this plant, called the branching spurry (*spergula arvensis ramosus*), which is now coming in general use. It comes earlier and is one-third more productive. I did not observe it in Great Britain, and the English farmers did not think it equal to many other grasses already in cultivation. It has been accidentally introduced into our country with our imported garden seeds, and is naturalized among some of the gardens on Charleston neck. I do not consider it of much value in our climate. It does not equal our wild peas (*vicia sativa* and *V. michelli*.)

In many portions of France I observed a very extensive cultivation of a grass resembling oats, called by the French, *l'Avoine élevée*; it is the *arrhenatherum avenaceum* of botanists. It is sometimes called *ray grass de France*. It has not, as far as I can recollect, been introduced into England, but I have heard Frenchmen praise it highly, even preferring it before our famed timothy grass. I have no doubt it would succeed in many parts of America. One of the earliest and best pasture grasses of Great Britain is the meadow fox-tail grass (*alopecurus pratensis*.) It is, however, better adapted to pasturage than hay, and requires two or three years after sowing to arrive at full maturity. But it is a perennial, seldom dies out in spots like many other grasses, and constitutes the greater portion of many of the richer pastures in Britain.

Until of late years the varieties of the common rye grass (*lodium perenne*), were regarded in England as producing more grass and hay than any other species. They are still cultivated almost universally on lands which are expected to be converted into wheat fields after one or two years. Some of these varieties are annuals, others perennial. None of them remain, however, more than three or four years, when it is necessary to recultivate the ground.

At the present time the Italian rye grass (*Lolium italicum*), is regarded on the continent of Europe as the most productive of all the species. It is perennial; the leaves are broader, and it is said not to be affected by the vicissitudes of either heat or cold. I observed this superior grass growing in the neighborhood of Hamburg—in Prussia, Saxony, Austria, and France—and heard but one opinion, which was of the most favorable character. In the French periodical (*Le Cultivateur, Journal des Progrès Agricoles*.) it is spoken of by Mr. Bouitteville, a very successful agriculturist, as one of the most valuable grasses in the world. He sows it with red clover among oats—ten pounds of rye grass to the acre.

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He concludes by saying, "I can assure you that its hay is excellent for feeding horses and cattle; and that its nutritious qualities are greater in proportion to its weight than that of the other hays and clovers."

In England, where it has but recently come into notice, the accounts I heard of it were very favorable. The following statement from a respectable farmer, whose name I omitted to notice, I extracted from an agricultural paper:

"I cut on the 1st July, 1837, from ten Irish perches of inferior land, my Italian rye grass; the stalks were from four to four feet and a half long. Product at first cutting nine bushels of seed, which I sold at 10s. 6d. (sterling) per bushel. Second crop on the same year from six to seven bushels, and stalk from three to three feet and a half high. The hay was of the best quality. I expect another crop next spring."

Seeds of this grass may be easily obtained from Hamburg or Havre.

There is residing in the department of the Loire an eminent agriculturist, by the name of Bailey, who has originated a striking and permanent variety of rye grass, called Bailey's rye grass. I saw it growing on the mountains of Bohemia and in France. It was stated to me, that although shorter in growth, it was thicker and finer in foliage, more permanent in duration, and yielded fully as heavy a crop as the Italian rye grass. From this variety were produced six thousand pounds to the acre.

I shall conclude this article on the grasses with a few observations in reference to our culture of those species which I conceive well adapted to increase the products of the dairy and to improve our soils in regard to the rotation of crops, in the maritime districts of South Carolina and Georgia.

1. *The dairy.*—It is well known that Charleston, Savannah, Augusta, Columbia, and all our large towns in the south, are but scantily supplied either with good milk or fresh butter. A number of families in Charleston make a comfortable support by keeping four or five cows each, purchasing the grass which is brought from the country, and selling milk. When the cows become dry, they are sold to the butchers and others are purchased.

I would propose that the following experiment be made by some enterprising, industrious man, who is not ashamed of his profession, and will take a pride in attending personally to his business.

Let a farm of one hundred and fifty acres be procured in the vicinity, of from three to six miles of the city. Let this farm be divided into suitable lots for the cultivation of grasses and vegetables, to serve as food for the cattle. Let one field be planted in herds-grass, (*dactylus glomerata*.) which answers our climate very well, as I have had it flourishing in my garden for the last fifteen years, and have frequently cut it as early as February. I would prefer planting the roots, which are easily divided, setting them out a foot or eighteen inches apart. The seeds vegetate pretty well, but the plants when young are often destroyed by more luxuriant grasses. Let a small field be planted with the roots of the Gama grass. It is very productive; cattle, although they do not prefer it at first, soon grow fond of it, and they do not seem at any time to refuse it when made into hay. Let alternate fields of oats, barley and rye be sown in drills, and at the same time sowing

broad cast over some of these fields about twenty pounds of Italian or common rye grass to the acre. Another field should be devoted to the cultivation of the common Guinea grass, which, although it comes rather late in spring, is very productive, and lasts till killed by the frosts of autumn. A small bed left for seed, covered during winter with straw, will produce an abundance of plants, which should be set out in rows eighteen inches apart and the plant standing eight or ten inches in the row. Another field set out in the same manner with Egyptian millet, (*pennisetum typhoideum*), one of the most productive grasses in the world, growing easily from the seed, and is thoroughly naturalized to our climate. Other fields I would have successively planted in vegetables, not for the market, but for the cows. These roots should be composed of turnips, ruta бага, kohlrabbi, sugar beets, carrots, &c. Thus an abundance of green food and vegetables would be successively furnished for every month in the year.

On this farm I would build extensive and airy, but not expensive stables, to secure the cattle against the cold of winter—and what is far more injurious, the heat of summer. The buildings should be so arranged that in summer the air may have a free circulation. Let forty or fifty cows among the best of the common breeds of Carolina be purchased; these may average about forty dollars per head. Keep among them a young bull of the superior English breeds. A stock may thus be provided in a few years adapted to our climate. Importations of grown cattle for our lower country are not advisable, as not one out of five survives two years, whereas those raised here do not seem to degenerate, and are as well adapted to our climate as the common variety.

Let the cows be housed all the year, and only be allowed to go out occasionally for exercise. Let their food be carried to them as in most parts of England, Belgium and Holland. They will be cooler in the stables than when exposed to the hot sun; our cows kept in confinement in Charleston thrive better than those that are turned out.

The manure and litter from the stables will, after the first year, go far to keep the land enriched.

Let careful attendants be provided for the cattle, and light carts used to convey the milk or fresh butter to market morning and evening. It is not my intention to estimate the profits of such an establishment, yet I cannot but think that it would be infinitely greater than that produced by any farmer in the vicinity of our city who has not invested a larger capital.

Should the above be regarded as a visionary scheme I would only ask not to be condemned before the experiment has been tried and failed.

2. *Grasses to be cultivated by the planter in the rotation of crops.*—My own experience will not allow me to pronounce positively on the best kind of grasses for hay or pasturage adapted to our southern climate as renovators of the soil.

The old method of cultivating the same field with cotton for a succession of years, and another with corn, until the lands are worn out, has been long tried, and the result has been destructive to the best interests of the planter. His lands are nearly worn out, and he has the prospect of leaving to his posterity a ruinous farm house, decayed fences, meager cattle, and a barren soil. It is a murderous system against which the earth cries

aloud for forbearance, and which the voice of experience unhesitatingly condemns. Balaam's ass stopped to remonstrate when he was overworked. It is treating our kind and teeming mother with ingratitude and cruelty—demanding, like the Egyptian task masters, bricks without straw—labor without rest. We have been experimenting on the fable of the golden egg, and are now realizing the fruit of greedy desires. Oh! for another Mantuan bard to awaken us from indolence and error—who would instruct us with that gifted father of agriculture,—

"Alternis idem tonsas cessare novales,
Et segnem patiere situ durecere campum."

Whilst we are furnished with such large plantations, it seems hard that our poor cattle should be suffered to pick up a scanty subsistence and waste their manure in the woods. We have a sufficient number of productions already in cultivation to enable us to alternate our crops: cotton, corn, sweet and Irish potatoes, rye, wheat, barley, oats, ground-nuts, guinea corn, &c.—I need not speak of rice—the heavens have it in charge, and a thousand rills carry to it the drainings of the richest valleys. Even in this particular a benefit has, in some instances, been found in either suffering the rice land to rest for a year, or alternating the crop. A highly intelligent and successful planter of Waccamaw informed me, that he had two years ago not planted a portion of his land in rice, but suffered the volunteer, or red rice, to spring up. It was ploughed under; a portion of the land was cultivated in oats—the remainder was kept as a pasture for cattle. In this way his land was in a measure freed from red rice—he was bountifully supplied with milk and butter, and the product of his rice-field was on the succeeding year one-fourth more productive than formerly.

We have in Carolina several species of native grasses, that have already been brought into cultivation, especially the crab and crow foot. These, however, are annuals, and the ground requires to be every year cultivated and manured. The fox-tail grass, elymas or lime grass, and many species of poa, festuca, and panicum, are the native products of our fields. From some of these, and many others that I have not enumerated, a selection might be made as an experiment, which, in the end, could scarcely fail of success.

But I would prefer making use of those grasses that have been already found to be successful in agriculture. The clover and timothy I have reason to fear, are not adapted to our dry, sandy soil. On the various species of grasses cultivated in Europe, which I have already enumerated, especially those of the south of France and Austria, as well as Italy, no experiment has been made. I doubt whether the Italian rye grass has ever been seen in the southern states and scarcely in America, although I have a faint recollection of seeing a few plants, some years ago, on the farm of Judge Buel, near Albany in New-York. A crop of oats, or rye, after the corn or cotton, would afford a sufficient shade for the grasses to vegetate, and after the spring grain was removed, would not only afford hay or pasturage for cattle, but renovate the soil and prepare it for the production of our staple articles. By this means our land and our stock of cattle would be improved—we would be less dependent on strangers for our

hay, meats, and butter, and in the end our cotton and corn crops would be more abundant. It is but fair that we receive from our New-England brethren their cotton cloths in exchange for our raw material, and their flour for our rice, but it is rather a reflection on our industry and enterprise when we look to them also for our hay and butter.

RHODE ISLAND AGRICULTURE.

From the New England Farmer.

We have great pleasure in presenting the following account of his year's operations from one of the best farmers not in Rhode Island only, but in New England. Mr. Antony's farm does not embrace a large extent or variety of agricultural operations; but as far as it extends, it may be considered as pattern farming. Of his improvements we have spoken repeatedly before. They are skillful and beautiful, and do him the highest credit. We have only one wish in respect to him and his farm; and that is, that he was on this side of the line, that he might come in as a competitor for some of our noble state premiums. We know he has no low ambition; but an ambition to make any portion of this earth which heaven puts under our custody, as productive and beautiful as labor or skill or art can render it, is an ambition with which a generous and grateful mind may justly be satisfied. H. C.

Report of the farm of Wm. Rotch, Jr., North Providence, Rhode Island, under the management of Adam Antony; and considerably devoted to the sale of milk in the city of Providence.

Tillage	30 acres.
English mowing	18 "
Pasture	26 "
Wood	30 "
Total	104 "

Soil generally dry and sandy; some redeemed peat meadow; much of the land formerly covered with pine.

Live Stock.

Horse	1
Oxen	2
Cows	18
Amount of sales in 1839	\$3294 85
Value of produce used or on hand	308 50
Labor in improvements charged to the owner	125 00
Incidental improvements on the farm, the lawful interest on which is added to the next year's rent	252 36
Cost of labor on the farm, including board	696 02
Incidental expenses	1394 04

Amount of Produce in 1839.

English hay, tons 50—average yield per acre	24 tons.
Millet, 41 "	24 "
Indian corn, bush. 258 "	644 bush.
Barley cut for fodder, tons 10 "	1 1/2 ton.
Potatoes, bush. 592 "	236 bush.
Turnips (French) bu. 500 "	650 "

Swedish turnips, bushels 800
Beef fattened, 9500 lbs.
Pork, 556 "
Corn fodder, tons 6
Manure made, cords 100
" bought, ashes 1400 bushels.

Notes by Mr. Antony.

Expenses of cultivating crops per acre—

Indian corn	\$47
Oats	24
Barley	24
Potatoes	44
Ruta baga	47
Beets	53
Carrots	59
Hay, including getting, &c.	24
Millet	24

Average yield of a cow per annum, in milk, 593 gallons.

Beef animals fattened on hay, Indian meal, flax-seed oil meal, and vegetables.

Pork fattened on Indian meal and boiled potatoes.

Seven cords of manure were applied to an acre; and of ashes from 100 to 240 bushels.

Lime and gypsum have not been found useful.—

Ashes are of great utility.

Ground oyster shells are, perhaps, good for nothing. No difference has been perceived in the effects of fresh or spent ashes. Potash, at the rate of 150 lbs. to the acre, has been found beneficial, and the same quantity of nitre. Have tried them, however, but one year, and know nothing of the permanency of either.

The most profitable articles of cultivation are considered rye and clover on light and sandy soils. On such as are of a better quality and firmer texture, the root culture is perhaps the most profitable.

Considerable hay and some vegetables are sold, but much the greater part of the produce is converted into beef and milk.

ESSEX AGRICULTURE.

From the New England Farmer.

The following account was received by us, but unfortunately was mislaid. It has not suffered by keeping; and will be read with much pleasure. It is a fair sample of New England farming; and shows a highly productive result. Very many are those who fall far below this product, over those who attain it, from the same number of acres.—Those whose imaginations and avarice are extended far beyond what is reasonable, see in such humble results as these, nothing to admire; but look with disdain upon such, in their opinion meager, returns. Yet it is by such a process and under circumstances thus restricted, that vast numbers in New England have found not only competence but independence; and have laid the foundation, indeed have carried up the superstructure of large and ample estates. H. C.

Mr. Colman—Sir—I have seen in one of the N. E. Farmers that you should like to have a statement of the produce of some of our farms. My farm is in Newberry, about one mile south of Newburyport. I have about 20 acres of good tillage

land, and about 15 acres of grass land too clayey for easy tillage. I have 30 acres of salt and black grass meadow: the remainder is pasture and woodland, containing in the whole about 110 acres — on which has been raised the present season 200 bushels of corn on about five acres, manured in the hill. I think that the storm of the 28th of August, destroyed one fifth of the crop. Six acres planted with potatoes, manured partly in hills and partly ploughed in, produced 1500 bushels. One acre and three quarters of onions, 740 bushels; one acre of winter rye, 26 bushels; three acres barley, 100 bushels; one acre of oats, 75 bushels one other acre cut for fodder, not thrashed. The oats were raised on pasture land never ploughed out once, and planted with potatoes the last year and manured in hills, this year harrowed, and 200 bushels of leached ashes spread on. I have 40 tons of English hay, cut the present season; 16 tons of black grass hay, 15 tons of salt and fresh hay, 60 barrels of winter apples, 11 barrels of cider, 40 bushels of beets and carrots, some pears, peaches, grapes and plums. I keep 1 horse, 4 oxen, 9 cows; calves sold 50 dollars; milk sold at the house 1500 gallons at 14 cents; and made some cheese in the hot weather. I have a son who takes the principal care of the farming. We hire two men seven months, at 17 and 18 dollars per month. We buy manure in Newburyport at \$1 75 and \$2 per load of half a cord or more; ashes 6 cents a bushel. I sell hay at \$14 per ton. Onions are sold at 50 cents a bushel. Onion ground we manure with about 12 loads to the acre; plough it in the fall; about 15th of April plough it again and sow when the ground is fit. I sow in rows 16 inches apart, three pounds of seed to the acre; two pounds are enough if we were sure all would be right: I think if we have plenty of manure it is best to plough it in; if we have not a plenty, make the best of it and put it in the hills; then we shall not miss unless a very dry season. To cultivate an acre of onions on my ground, would cost about 25 days' labor.

Summary of the above.

No. of acres, 110
Products.—Indian corn, on 5 acres, 200 bushels.
 Potatoes, 6 acres, 1500 bushels.
 Onions, 1½ acre, 740 ‘
 Beets and carrots, 40 ‘
 Winter rye, one acre, 26 ‘
 Barley, 3 acres, 100 ‘
 Oats, 1 acre, 75 ‘
 English hay, 40 ‘
 Black grass, 16 ‘
 Salt and fresh hay, 15 ‘
 Winter apples, barrels 60 ‘
 Cider, 11 ‘
 Milk sold at the house at 14 cts. per gall., 1500 gallons.
 Calves sold, 50 dollars.
 I raise plenty of peas, beans, cabbages, turnips, squashes, &c.

I should like to find some machine to dig potatoes with oxen or horses.

November 23, 1839.

WIRE WORM.

From the Third Report of the Agriculture of Massachusetts.

Wheat, besides being subject to various diseases, has enemies to contend with among the insect tribes, which are formidable and often destructive. The wire worm is well known to farmers; and several cases of injury from his ravages are mentioned in the reports. These are principally found in lands which have been some time in grass, and newly broken up. On this account where they abound, to sow wheat on green-sward ploughed up, would not be advisable. A farmer in Williamstown, whose land was much infested with these worms, and whose corn crop always suffered severely from them when it was planted upon grass land newly broken up, found great advantages in ploughing his land in the fall, by which operation he thought many worms were destroyed by the frost; and then taking a crop of oats, which they were not likely to injure, before he took any other crop. This was followed by corn, and then by wheat. They are not disposed to stay in cultivated land, but prefer that which is in grass. Another farmer in Templeton, whose statements seemed entitled to confidence, is in the habit of getting some salt in the compost heap, with which he manured his corn. He says in this way his corn has escaped the depredations of the wire-worm, while his neighbors' corn over the fence would suffer severely. He has been accustomed to do this for several years, but could give me no definite rule as to the proportion of salt used in the heap. As well as I could gather from his statements, however, it was not large. To all soft-skinned worms, such as slugs, &c., the application of caustic or quick lime, if a small amount comes in contact with them, will prove destructive; but this does not seem to be the case with those which are encased in an armor of horn. The application of lime, therefore, in the hill with corn, is not found a preventive against the injury from the wire worm.

E. Phinney, of Lexington, whose authority is entitled to the highest respect, “advises in the ploughing of green sward to turn over in the spring, say from the first to the middle of May, after the grass shall have started a few inches. The reasons are, that generally a greater quantity of vegetable matter is turned under; the sod will turn over smoother in the spring than in the autumn, the grass is much less likely to spring up between the furrow slices, which materially injures the crop; and lastly, the worms which commonly abound in grass ground, are less likely to injure the crop. The reason must be obvious. Finding no green substance in land turned over in the fall to feed upon, they invariably seize upon the growing crop. Where the green sward has been thus turned over in the spring, after the grass has started, it is affirmed upon experience that injury from the worm does not occur, but when this is done in autumn, it is rarely otherwise.”

N. Bennet, of Farmingham, thinks “turning over green sward in August, a perfect remedy for the corn or cut-worm, which is the wire-worm here referred to. By ploughing so early in the season, the grass has time to spring up and grow before winter between the furrows; and when he cross-ploughs in the spring, the young grass furnishes a sufficiency of food for the worms, and there-

fore the corn is not injured by them." Robert Colt, of Pittsfield, whose farming, as well as that of Mr. Bennet, has been honored with the premiums of the Massachusetts Agricultural Society, says "that he is satisfied from experience, years since, that the ploughing of green sward or stubble in the autumn, is a loss in the following crop of at least ten per cent. Sward lands, that are ploughed in the fall become compact during the winter; the finer parts washed between the furrow slice, excluding the air, and preventing the surplus water from draining off; consequently the turf lies heavy and dormant, with but little benefit to the crop. On the other hand, if ploughed in the spring, the soil is light and receives the harrow kindly; and the furrow slice does not become so compact as to prevent the circulation of the air, and allows the excess of water to take its proper course; and the sward, when the crop comes off, will be in a more forward state of decomposition than if ploughed the fall before."

These various opinions, coming from practical men of much intelligence and long experience, deserve attention. It would not answer to delay the sowing of wheat until the middle of May, as there would be great risk in our climate of its suffering from mildew. If wheat is to be sowed on green sward, it should be ploughed much earlier. But this would not in that case afford the protection against the wire-worm to which Mr. Phinney refers. I must dissent from the inference, (at least, I hold my judgment in suspense until I have farther light,) that this late spring ploughing is to be deferred on account of the superabundance of vegetable matter then to be turned under. Theory and experiment in this matter conflict with each other. I have been always inclined to the belief, which generally prevails, and which Mr. Phinney maintains, that the higher the state of luxuriance in which vegetable matter is turned in by the plough, the more the land will be enriched by it. But the experience of one of the best farmers in the state has satisfied me, especially as it had been confirmed by another equally intelligent farmer, and wholly unbiassed by the judgment of any other person, that the land is more benefited by the turning in of the clover after it is dried, than when in a state of greenness and full of sap. The opinion is, that if green it creates an acidity in the soil prejudicial to the succeeding crop. I do not know whether this theory be sound or not; but I have seen an experiment tried with a view to this point, in two adjoining lots of ground in the same field; and the result was conclusive in favor of turning in the crop when dried. Mr. Colt's opinion in favor of spring ploughing or against fall ploughing, bears on the same point. The conclusion, which seems to follow from these premises, is against sowing wheat upon green sward, on account of the wire worm. In such case, corn or oats then should be taken as a first crop; and corn may be taken, as Mr. Phinney advises, on a late ploughed sward, as the disadvantage, if there be any, in the comparison between turning in the herbage, in a green instead of a dried state, may be more than compensated by the protection which it furnishes against the worm; but if wheat is to be sowed, on green sward or stubble, on account of the results of Mr. Colt's experience, whether his notions be well or ill founded, it is to be advised to plough in the spring; but

then as early as possible; because, as I am satisfied, of the expediency under all circumstances of sowing spring wheat as early as possible. In this case, the chances of the worm must be encountered, unless the mixture of salt with the compost, as mentioned above, may afford a security against him.

GATHERINGS FROM GRAVEYARDS, &c.

By G. A. Walker, Surgeon. Longman and Co., 1839.

From the Medico-Chirurgical Review.

The object of the present work is, to open the eyes of the public to the dangerous and disgusting results arising from the present practice of interments in the heart of cities, and in the midst of a dense population; and to endeavor to procure "the entire removal of the dead from the immediate proximity of the living." It cannot be denied that the present manner of burial has become a serious evil, and one well worthy of the attention of the government; but we are afraid that the custom, which originally arose from the credulous belief of the common people in the powers of the church over souls after death, inducing them to seek a grave in the immediate neighborhood of some place of worship as a protection against the enemy of mankind, is now too deeply rooted in the human mind to be easily eradicated.

Setting aside, however, the deleterious effects to the human frame from the pestiferous vapors continually exhaling from such enormous masses of putrefying remains, which must exercise a most baneful effect, especially on those living in the more immediate vicinity of these pest-holes,—we think that, if the public attention were to be once fully directed to the disgusting and monstrous practices continually resorted to with regard to the ashes of the dead, in order to make room for fresh supplies, they would be inclined to prefer a sepulture removed from the town, and in which they might rest in peace, to the present revolting practice of huddling up as many human bodies as can possibly be crammed into one narrow space in order that the proprietors of these places may reap as great a harvest as possible. Let us take, for example, one case detailed by our author: he is speaking of the burying-ground underneath Eton Chapel:—

"This space measures in length 59 feet 3 inches or thereabouts, and in width about 23 feet 8 inches so that its superficial contents do not exceed 1,700 square feet. Now, allowing for an adult body only twelve feet, and for the young, upon an average, six feet, and supposing an equal number of each to be there deposited, the medium space occupied by each would be nine feet: if, then, every inch of ground were occupied, not more than 189 (say 200 in round numbers) would be placed upon the surface; and admitting (an extravagant admission most certainly) that it were possible to place six tiers of coffins upon each other, the whole space could not contain more than 1,200; and yet it is stated with confidence, and by credible authority, that from 10,000 to 12,000 bodies have been deposited in this very space within the last sixteen years!" 237.

It is not long since an extreme sensation was

excited by the greatly exaggerated tales with regard to the practice of exhumation for the purposes of dissection, but we must say that none of these tales could at all equal the wholesale exposure and dismemberment of the dead which must here have been had recourse to.

Having thus given an extremely slight sketch of the history of burial places, (for an exceedingly interesting description of which we must refer the reader to the book itself,) we will now follow the author in his description of the state of some of the

Burying-places of the metropolis.

Burying Ground, Portugal Street.—"The soil of this ground is saturated, absolutely saturated, with human putrescence. * * * The effluvia from this ground at certain periods are so offensive, that persons living in Clement's Lane are compelled to keep their windows closed; the walls even of the ground which adjoins the yards of those houses, are frequently seen reeking with fluid, which diffuses a most offensive smell." Typhus fever appears to be very prevalent in the neighborhood, especially in Clement's Lane, which is absolutely surrounded by burying-grounds.

Enon Chapel.—The upper part of this building is devoted to the purposes of public worship, underneath it is the burying-ground, being separated from it only by boarded floor. From ten to twelve thousand bodies have been placed here, since its establishment, in pits, the uppermost of which were covered only by a few inches of earth.

"Soon after interments were made, a peculiar long narrow black fly was observed to crawl out of many of the coffins; this insect, a product of the putrefaction of the bodies, was observed on the following season to be succeeded by another, which had the appearance of a common bug with wings."

A Sunday school is held in the chapel.

"Residents about this spot, in warm and damp weather have been much annoyed with a peculiarly disgusting smell; and occasionally, when the fire was lighted in a house abutting upon this building, an intolerable stench arose, which it was believed did not proceed from a drain. Vast numbers of rats infest the houses; and meat exposed to this atmosphere, after a few hours, becomes putrid." 156.

St. Clement's Church, Strand.—There is a vault under this church called the 'Rector's Vault,' the descent into which is in the aisle of the church near the communion table, and when opened, the products of decomposition of animal matter are so powerful, that lighted candles, passed through the opening into the vault, are instantly extinguished; the men at different times employed, have not dared to descend into the vault until two or three days had elapsed after it had been opened, during which period the windows of the church also were opened to admit the perfilation of air from the street to occupy the place of the gas emitted;—thus a diluted poison is given in exchange from the dead to the living in one of the most frequented thoroughfares of the metropolis. The other vaults underneath the church are also much crowded with dead. From some cause, at present doubtful, these vaults were discovered to be on fire*

upwards of fifty years ago; they continued burning for some days, and many bodies were destroyed." 158.

There was formerly a well by the side of the church but the water became so nauseous that it could not be drunk, owing to its becoming impregnated with the putrefying matter with which the ground was charged.

Drury Lane Burying Ground.—The ground is now raised to a level with the first-floor windows, surrounding the place: in it have been deposited some thousands of bodies.

Whitechapel Church.—The burial-ground adjoining the church, placed, in the midst of a dense population, is so thickly crowded as to present one entire mass of human bones and putrefaction. "In digging a foundation for a new wall, the workmen penetrated through a mass of human bones eight or ten feet in thickness; these bones were thrown out and for some time lay exposed to public view, scattered over the ground in a loathsome humid state."—These were afterwards deposited in two or three pits which were filled up to within a few inches of the surface.

Bunhill Fields City Road.—In this burial ground occupying about seven acres, more than one hundred thousand interments are supposed to have taken place.

Mr. Walker has given a detailed account of many more of our metropolitan cemeteries; but we think that, from what we have furnished, the reader will be able to form a pretty accurate judgment of the remainder. We will, therefore, extract the account of only one more to show that this system is not confined to the poorer parts of the town, but extends even to the immediate vicinity of the palace.

Buckingham Chapel, situated in Palace Street, about three minutes' walk from Buckingham Palace. There are two vaults and a burying-ground belonging to this chapel; one of the vaults is underneath very large school-rooms for boys and girls,* and the other is underneath the chapel; the entrance to these vaults, is through a trap-door, in the passage, dividing the school-rooms from the chapel; steps lead to the bottom of the building; on the right is the vault underneath the schools. When I visited this place a body had recently been interred, and the effluvia from it was particularly annoying. The vault is supported on wooden pillars, and there is only one grating which fronts the street, to admit light and air; the floors of the school-rooms, white washed on the under surface, form the roof or ceiling of the vault—it is no difficult matter to see the children in the lower school-room from this vault, as there are apertures in the boards sufficiently large to admit the light from above. This place is spacious, but very low;—the vault on the left under the chapel is about the same size as that under the schools, though much lower. I was assured that the ground was so full of bodies, that there was difficulty in allotting a grave; the roof of this vault is formed by the under surface of the floor of the chapel; it is white-washed, the light passes through it; the smell emitted from this place is very offensive. In the vault underneath the

vaults underneath St. James's Church, Jermyn Street, many years since, were on fire."

* "Some hundreds of children here receive their daily education."

* "This is not a very unusual circumstance; the

chapel there are piles of bodies placed in lead; the upper ones are within a few inches of the wooden floor." 184.

We will not attempt to offer any comments on the facts which have here been detailed; they speak for themselves.

The remainder of the work is principally occupied by the consideration of the ill effects produced on the human constitution by these putrid exhalations; out of the immense number of cases brought forward by our author to prove their dangerous tendencies, we will select two only as illustrations of the results produced during the two most dangerous stages of animal decomposition, which he considers to be,—1st, that which takes place almost immediately after death, and the 2nd, during the extreme degree of putrefaction. As an instance of the evil consequences produced by the exhalation of the gases generated during the first stage, we may quote the following case.

"In the month of June, in the year 1825, a woman died of typhus fever, in the upper part of the house, No. 17, White House Yard, Drury Lane; the body, which was buried on the fourth day, was brought down a narrow staircase; Lewis Swaltheby, shoemaker, then living with his family on the second floor of this house, and now residing at No. 5, Prince's Street, Drury Lane, during the time the coffin was placed for a few minutes, in a transverse position, in the door-way of his room, in order that it might pass the more easily into the street, was sensible of a most disgusting odor, which escaped from the coffin. He complained almost immediately afterwards of a peculiar coppery taste, which he described as being situated at the base of the tongue and posterior part of the throat; in a few hours afterwards, he had at irregular intervals slight sensations of chilliness, which before the next sunset had merged into repeated shiverings of considerable intensity; that evening he was confined to his bed,—he passed through a most severe form of typhus fever; at the expiration of the third week he was removed to the fever hospital—he recovered; he had been in excellent health up to the instant when he was exposed to this malaria." 132.

The effects of the gases produced during the extreme state of putrefaction are illustrated by the following case.

"My pupil, Mr. J. H. Sutton, accompanied by an individual, for many years occasionally employed in the office of burying the dead, entered the vaults of St. — church; a coffin, 'cruelly bloated,' as one of the grave-diggers expressed it, was chosen for the purpose of obtaining a portion of its gaseous contents. The body, placed upon the top of an immense number of others, had, by the date of the inscription on the plate, been buried upwards of eight years; the instant the small instrument employed had entered the coffin, a most horribly offensive gas issued forth in large quantities, Mr. S. who unfortunately respired a portion of this vapour, would have fallen but for the support afforded by a pillar in the vault; he was instantly seized with a suffocating difficulty of breathing (as though he had respired an atmosphere impregnated with sulphur); he had giddiness, extreme trembling, and prostration of strength; in attempting to leave the vault, he fell from debility; upon reaching the external air, he had nausea, subsequently vomiting, accompanied with

frequent flatulent eructations, highly fetid, and having the same character as the gas inspired. He reached home with difficulty, and was confined to his bed during seven days. The pulse which was scarcely to be recognised at the wrist,—although the heart beat so tumultuously, that its palpitations might be observed beneath the covering of the bed cloths,—ranged between one hundred and ten and one hundred and twenty-five per minute, during the first three days; for many days after this exposure, his gait was very vascillating." 133.

The remainder of the book is devoted to a general *resume* of the principal facts and observations contained in the preceding pages.

Having now completed our review of this work, it only remains for us to say that it will be found well worth the perusal of every person at all interested in the preservation of the health, decency, and cleanliness of the metropolis, and may, perhaps, prove not unacceptable to the general reader, as presenting a complete and curious history of the different modes of interment which have been resorted to among different nations, as well as for its novel description of the burial-places of London which we believe, have never, until now, formed the subject of any work.

In taking our final leave, we must, in justice to Mr. Walker, state, that the book is clearly and vividly written, and the author deserves great credit for the industry and zeal which he has displayed in his by no means agreeable researches among the graveyard; we hope, however, that he may reap a full reward for his labors, by seeing the disgusting nuisance against which he has declared war, at least mitigated, even if not altogether put a stop to.

EDGINGS FOR A FLOWER GARDEN.

From the Horticultural Journal.

For an edging, box is chiefly recommended. Box!—not always kept in order, and in such a case a harbor for vermin!—the most greedy and rapacious blood-sucker of every thing within its reach, the exhauster of the virtues of the richest compost. Next come thurst, bachelor's buttons, primroses, and even London pride, all tending to weeds, and all growing out of line: to avoid this, flower beds are often edged with board, which soon falls to decay. The best and most permanent edging I have ever met with is slate, set lengthways, three inches under, and three inches over the level of the alley or walk, the edges of the beds filled in the interior to the full height of the slate. I know an edging of this description made sixteen years ago, which is still in the highest perfection; at first, the outside of the slate was painted green, which gave a great neatness to the garden; soon after, an edging of gentianella was planted at the inside of the slate and close to it, which came into great beauty, and hung over the outside, forming an edging at top of three or four inches wide, requiring very little attention, and decorating the edges of the beds with a profusion of its large, rich, and graceful blue flowers, which, when lined by a single row of yellow crocus, usher in the spring in the most vivid colors. A chief perfection of this edging is, that it is permanent.

POWERS OF THE ARAB HOSE.

From Fraser's Tartar Journey.

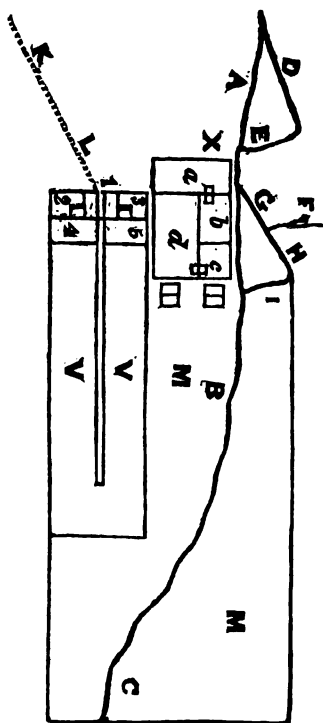
I am tempted to mention to you one feat of an Arab horse, the property of a person who has more than once been mentioned by me in these letters, Aga Bahram, and which has not, so far as I know, been ever doubted. This animal came from Shirauz to Tehran, 620 miles, in six days; remained there three days, went back in five; remained at Shirauz nine, and returned again to Tehran in seven days. This gentleman told me that he had once rode another horse of his own from Tehran to Koom, twenty-four fursucks, or about eighty-four miles, between the dawn of a morning near the vernal equinox, and two hours before sunset—that is, in about ten hours. This, too, is good going: but Aga Bahram had always the best horses in Persia.

MANURING.

For the Farmers' Register.

Preface.—Although my name is not known in the communication headed, "Farm-Yard, &c." in February No. of the Register, page 126, yet I was mortified to find my horse and cow yards, and intended piggery, so illy represented by the cut. Mr. Ruffin has a multiplicity of business to call his attention, and the most important should claim his direct attention; consequently, in this matter, no apology is either wanted or required; nor should I have adverted to the subject had I not a desire to lay before the public my manuring operations; in doing which my yards will again be brought into view.*

* We are not yet aware of the ground of complaint against the correctness of the engraving. As reference to it would be necessary for the understanding of the present communication, no less than the former, the figure is again inserted, that it may speak for itself, as well as serve for explanation.—Ed F. R.



In the month of November last, I carted from horse yard *a*, 82, and from steer *d*, 160, in all, 242 heavy ox-loads of manure.

On the first of December, my steers and grown dry cattle were yarded in *d*, and having more pork hogs than usual, yards *b* and *c* and another were appropriated to their use, whilst the milk cows and calves were shamefully made to find their own shelters through the winter. On the first day of March, my cattle were turned from the yard, and two carts and ox-teams started to draw out the manure as follows:

From horse and cattle yards as above,	
for corn - - - - -	242
From cattle yard <i>d</i> , for corn - - - - -	318
" horse yard <i>a</i> , do. - - - - -	92
" hog yard <i>b</i> , do. - - - - -	82
" hog yard <i>c</i> , do. - - - - -	78
" hog yard additional, for corn - - - - -	66
" ox yard do. - - - - -	30
Saw dust, chips and scrapings, for oats - - - - -	79
Waste straw and hay, on galls - - - - -	42
From hog yard, for beets - - - - -	11
600 bushels ashes saturated with marine salt at the rate of one per cent., for corn and cabbage, equal to - - - - -	120
	1160

Let it be remembered, that my milk cows and calves were not yarded through the winter, and that my steers and dry cattle were likewise not yarded during one-half of the feeding season. I wintered also 220 grown sheep, which were fed liberally with hay and cut oats, all of which feedings, of both cattle and sheep, and beeves, (which till this moment had been forgotten,) were on grounds requiring manure, and supposed to amount to at least - - - - - 740

I am now ploughing down 25 acres of rye, and sowing millet and peas to be again ploughed down, equal to - - - - - 500

Total manurings for 6 laborers one year 2400

My crop of rye is much injured by rust, (and so far as I can learn the disease prevails,) otherwise I should not have ploughed down so great a portion of the crop. I am pleased with the millet, both for hay and improvement. All my hogs at my place of residence are yarded this year, it being the first of my experience in this practice. They are littered with leaves from the woods, and green weeds and grass, which in part is their food.

The reservoir *D*, *E*, has been excavated, but I have not yet taken the time to remove the mould to my yards. If not deposited in the yards within a short time, it is intended to be spread on the meadow *M*, *M*, next winter, after which the meadow will be cut with the couler, harrowed and rolled. The reservoir *G*, *H*, *I*, is also full and valuable.

The ashes mentioned, were mostly obtained from the burnings of timber on newly cleared land, every five bushels of which, with one per cent. of salt, I consider equal to a load of dung.

Last winter I made an effort at carting leaves into my yards, but the weather proved so unfavorable that I only got in about 100 loads. I have leaves in abundance, at the distance of six to eight hundred steps from my yards, and hope to hand Mr. Ruffin a good long tally next year. My oats

now growing on the oat fallow of last year, bid fair to yield thirty bushels to the acre; which is about double what the yield would have been last year, had they not been ploughed down. My harvested oats of last year yield about forty bushels the acre; a small portion of which I computed as high as sixty.

The first item in the above account, viz. 242 loads manure, was the remains of the accumulations of the previous year, but as I have now on hand more than this quantity, which is to be entered for next year, I suppose no objection can be raised to the entry.

I spread from 40 to 64 loads of manure to the acre, (average about 50)—that from the stables and hog yards, on clays; and that from the cattle yards, on loams and sands.

My sheep are never yarded, except the ewes and lambs in the severest winter weather; and for their accommodation I am now engaged in constructing a cot, and yard of about half an acre. From the yard, the manure will be moved about the middle of March; the ground being in artichokes, they are to be rooted out by hogs, from say 10th of November till 10th of December, when the yard is again ready for the ewes and lambs. This sheep yard, with other adjoining, is now in beets, but will be planted in the artichokes next spring; the artichokes being now growing in an adjacent field. I suppose the proper method of cultivating this crop is to drill, plough and hoe, the first year; but after having been rooted by hogs they need no further attention, except perhaps to pull out a few straggling weeds on vacant spots. The crops must be abundant on grounds thus highly manured.

My crop of corn is mostly on bottom grounds, and my ditches are already opened for the purpose of conveying a creek thereon so soon as the culture of the crop is completed.

MOUNTAINEER.

Amherst, June, 1840.

REMARKS ON CORN CULTURE—BEANS—GREEN-SWARD, ETC.

To the Editor of the Farmer's Register.

June 10th, 1840.

In your May number, I have read with more than ordinary interest, the appendix of the Rev. Henry Colman to Mr. Webster's agricultural address, which I had perused before; and the communication by Mr. Thomas B. Stevenson of Kentucky. There are, however, a few things in them to which I beg leave respectfully to state some objections. First, however, permit me to say a word or two of some of my own notions in regard to corn culture, which your correspondent S., of South Carolina, seems to have misunderstood, or I misunderstand him. For he appears to ascribe to me as a fixed opinion, what I offered merely as a conjecture, relative to the effect upon the crop of cutting corn-roots. The fact is, that this process which takes place more or less, in every mode of culture that I have ever yet witnessed, has always been to me a great mystery, and one of which I have never seen any satisfactory explanation. Between the various methods pursued by the most successful corn-makers, there is a vast

difference in the extent to which the roots are cut; and yet fine crops are often found upon good land, under all their modes of culture, if the seasons have been favorable. This could not possibly happen, if cutting the roots was any thing like as injurious, as we have generally supposed. Two of the best corn-makers I ever knew cultivated altogether with the two-horse plough; yet their crops were certainly never inferior, as far as the eye could judge, to any others where a different process had been adopted. The fact is undeniable, and the only difficulty is, how to account for it. I believe, with your correspondent S., that, "if it were possible to avoid it," we should find it best "never to cut the root of any plant in its culture." But, is it possible? If it is, I cannot even imagine such possibility. No body, I believe, doubts that keeping the earth loose to a considerable depth, is absolutely necessary to the vigorous, healthful growth of all cultivated plants whatever. But the man who could do it without cutting many of the roots, would be very little, if at all, inferior to the famous artist John Emanuel Scholtz, described by Dr. Swift, who, among many other most marvellous feats enumerated by the dean, could "heat a bar of iron red hot, and thrust it into a barrel of gun-powder, before all the company, and yet it would not take fire."

Mr. Taylor's method is certainly a very good one, for he makes excellent crops; but it is pursued in its most important particulars by thousands. Still, there is unavoidably much root-cutting in it, and no greater crops are made by it, than by some different methods, where the lands are equally as fertile, and the proprietors equally as industrious, attentive and skillful, as Mr. Taylor. It has, however, one very great advantage over the old fashions, which prevailed some 30 or 40 years ago: it saves a great amount of labor, and is therefore far preferable, on this account, if on no other.

Suffer me now to state my few objections to the Rev. Mr. Colman's appendix, and to the communication of your South Carolina correspondent, S. In speaking of the bean, the first named gentleman says—"the varieties of the bean are two, garden and field beans, the white and the gray." Now, if Mr. Colman is right, all our botanical books are wrong; for they enumerate at least twenty species. Four of these are given in Bridgeman's gardening; and, of the *vicia faba* alone, he names twelve varieties, whilst he arranges under the other three species, twenty-seven varieties more, making 39 in all; and Loudon, in his "Encyclopædia of Plants," states about the same number. Mr. Colman, I presume, is too good a botanist to be ignorant of the facts, and, therefore, has been somewhat careless, (to say the least of it,) in limiting the number of varieties, even of the *vicia faba*, to two. It is a great departure from his usual particularity and correctness of description.

To a part of Mr. Stevenson's communication I object, on account of his giving, (as almost all the Kentucky farmers do,) the name "blue-grass," to the "green-sward," or "goose-grass," or "lawn-grass;" all of which names it bears. This is of a yellowish green, and cannot, therefore, with propriety, be called "blue," whereas, the true blue-grass is really of a bluish green, and hence it takes its name. It is very different from the "green-sward," in appearance; is more hardy,

and bears grazing far better, but it is more troublesome in cultivated lands. I have been led to these remarks from having experienced considerable inconvenience, as I have no doubt many others have, from the variety of names often given to the same plant. Let a few examples of this very troublesome practice suffice. The "red-top" is frequently called "herds-grass," and so is "timothy," although they are as unlike as bottle-brush and rib-wort. The orchard-grass is also called cocks-foot, and the crab-grass crows-foot, whilst the lucerne, in some places, bears the name of French clover. When we come to mention noxious weeds, the confusion of names is still greater. Although I know of no sure remedy for this evil, we might certainly, I think, diminish it greatly, if we would take as much care in applying the common appellatives as in using the botanical terms; but this is never done. The neglect of this practice in a friend, who once sent me some pure cockle seed from London, under the very attractive name of "*rose campione*," actually betrayed me into sowing it very carefully in a rich spot of my garden; notwithstanding, I strongly suspected that it would turn out to be an old and very pestiferous acquaintance. I might mention many other similar annoying accidents, involving a loss of both time and labor; and I doubt not that several of your correspondents could add considerably to the list. But the foregoing remarks, I hope, will suffice to call their attention and yours to the subject in a way to produce some better remedial suggestion than my own. "In the multiplicity of counsel," our proverb says, "there is safety;" and if we brother farmers and planters would oftener volunteer to give it, we might remedy, in a great measure, the total neglect of our interests, by those whose duty it is, and whose special business it should be, to labor assiduously for their promotion.

No more at present, from your old friend and co-laborer,
JAMES M. GARNETT.

NOTES OF NORTHERN SILK-CULTURE.

Extracted from the Third Agricultural Report, made by the
REV. HENRY COLMAN, Agricultural Commissioner of Massachusetts.

Amount of silk to an acre, and cost of production.—Questions of great importance come up here, respecting the amount of silk which may be produced upon an acre of ground, and the cost of production at the rates of labor existing among us. On these subjects conjectures abound; and calculations respecting the amount to be obtained so enormous and extravagant, that they are much better suited to form a chapter in the Arabian Nights' entertainment, than to enter into the thoughts of any sound mind. Conjectures, however, in matters of this kind, are not what we want; and it does not belong to me to present them to the farmers of Massachusetts. I have to lament, however, that few exact experiments in this case have been made in the country; and that many points, the decision of which, in my opinion, is more likely to have a favorable than an unfavorable influence upon the silk culture, remain to be determined. In my intercourse with the agricultural community, the mortifying conviction is

continually forced upon me, of the very small number of persons, upon whose authority any strong reliance can be placed for that exactness of observation, which constitutes the first element of all true science, and all useful and practical information. It is said that in the map of the world in use among the Chinese, and to which they go to study geography, the empire of China occupies about two thirds of the whole surface. Too many of our farmers in their sketches of their own domains, and their own operations, are too prone to measure things by this Chinese scale. I shall have the pleasure, however, of referring to some authorities entitled to entire respect and confidence, to the extent to which they go.

1. Timothy Smith, of Amherst, who has had considerable experience in the production of silk, says in a letter to me, "I consider that one acre of white mulberry, set in hedge rows, will yield foliage for fifty pounds of silk; and presume to say that an acre of multicaulis (Perottet) will yield double the quantity to an acre of white. I consider that reeled silk cost me about two dollars per pound, not over; although it was a year of experiments; but feel confident that in two or three years, by using the best kinds of mulberry and the better economy, that silk can be made for one and a half dollar per pound."

In a subsequent letter, Mr. Smith remarks, "I consider the multicaulis the most tender variety of any that I have cultivated. I consider the Canton as my best mulberry tree for raising silk, taking into consideration the hardihood of the tree, and the quantity of foliage it yields. I like the Italian white; and think it best to cultivate some of each variety."

I understand Mr. Smith here to estimate, in the cost of the silk, the value of the labor only; and to charge nothing for the use of the land and the cost and care of the trees; nor any rent for his cocoonery. These items would add something to the cost of the silk, but it is not easy to calculate them, from the imperfect elements which are given. It will be seen in this case, that although Mr. Smith has had some experience in the production of silk, yet that his statements are somewhat conjectural. In his supposition, likewise, that he could obtain one hundred pounds of silk from an acre, planted with the Perottet mulberry, and that he hoped to reduce the cost of the production of reeled silk to one dollar and a half per lb., a little allowance is perhaps to be made for the quickness of pulse, which in that time of excitement was felt by every cultivator of mulberry trees in his visions of the profits of the multicaulis.

2. The next approach to the actual cost of the production, is presented by James Deane, M. D., of Greenfield, Mass. His admirable letter to me on the subject, I shall give in the appendix. He estimates the cost of producing reeled silk at from two to two dollars and a quarter per pound. He produced the last year several pounds of silk of as fine a description as could be made. When he undertook the culture of silk, he had never seen a silk worm nor a silk reel. He constructed a reel admirable for its simplicity and efficiency, of which I shall give an engraving; and his operations from the beginning to the end were crowned with perfect success. This demonstrates the great simplicity and feasibility of the operation. Dr. Deane is so remarkable for his carefulness, that his

statements, where statements are given, may be implicitly relied on. The cost of producing the silk, however, is with him rather a matter of estimate or judgment, than of a careful observation of every minute charge; and, like Mr. Smith's, embraces only the labor applied.

3. The next authority to which I refer is that of D. V. McLean, of Freehold, Monm. Co., New Jersey. No experiment has been given to the country so numerous in its details and instructive in its results, as this. From the time employed and the wages paid for the production of twelve pounds of silk, he comes to the conclusion, that raw silk may be produced and reeled at the rate of two dollars to two dollars and one quarter per pound, though he admits, that "his cost him much more than this." This likewise is to be understood as the cost of the labor only applied to the production of the silk from the eggs; and without any allowance for land, trees, or cost or rent of cocoonery.

4. In Mansfield, Connecticut, it is customary with those who have trees, to furnish the eggs, to board the woman employed in the process, and to allow her half the produce in silk. She performs all the work, from the hatching of the worms to the reeling of the silk. The board of a woman in this case is estimated at one and a half dollar per week. I have no means of ascertaining how many worms a woman would be able to manage. The general estimate is, that one woman will feed 60,000 worms. It has been stated to me, that in one instance, one woman took the care of 120,000 worms; but I am unable to obtain the particulars of the case; and to learn whether she had any aid in picking the leaves or not. In the commencement of the feeding, the time of one woman would not be occupied entirely by an amount of worms, which at the close of the feeding season would require her whole and exclusive attention. Various circumstances, likewise, must come into the account; such, for example, as the facilities for feeding the worms; whether the leaves are to be gathered from high standard trees or from shrubs; and whether they are to be plucked from the white mulberry or the improved varieties. In the improved cocooneries small cars fixed upon a railroad are used to convey the leaves from one end of the room to the other; and at a great saving of labor and time. The use of hurdles, likewise, so as to facilitate the cleaning of the worms, will serve to lessen the labor. Practice and experience, as in all other cases, may be expected to bring with them their usual advantages. Under these circumstances, it is not easy to determine how large a family of these industrious and hungry operatives may be placed under the stewardship of one person. In Mr. Smith's operations, two women were occupied about five weeks in feeding the worms for the production of about twenty pounds of silk; but how long was required for the reeling is not stated. They received three dollars each per week, and board, which must be rated at one dollar and a half each per week. In Mr. McLean's experience, the labor of two women and a man twelve weeks each, would be required to attend upon one acre or 160,000 worms; and he estimates their expenses, including board, at three dollars per week each. These wages might be deemed ample for a woman's labor, but it is not more than half of the cost of man's labor in Mas-

sachusetts. Mr. McLean's cocoonery, which I had the pleasure of visiting, combines many advantages of construction; and his foliage was gathered from the Perottet mulberry, planted the same spring, and growing luxuriantly directly in the vicinity. His experiment, however, though conducted in a manner creditable to his remarkable intelligence and public spirit, cannot be said to determine in a satisfactory manner the cost of production; though I think it fully decides the question at the present prices of raw silk and of sewings, in favor of the profitability of the culture, within reasonable limits; and at a fair value of land, labor, and trees. Any very great increase of production must of course be followed by a reduction of price.

5. Calculations made by John Fitch, of Mansfield, Connecticut, are as follows. I have not the pleasure of a personal knowledge of Mr. Fitch; but his reputation is a guaranty for the correctness of his statement. It is, as will appear, somewhat matter of judgment, but, I presume, founded upon experience.

One acre of full grown trees, set one and half rod apart, will produce forty pounds of silk.

The labor may be estimated as follows.

For the three first weeks after the worms are hatched, one woman who is acquainted with the business; or children, who would be equal to such a person.

For the next twelve or fourteen days, five hands, or what would be equal to five, if performed by children. In this period, two men with other help would be employed to better advantage, than all women and children. This period finishes the worms.

For picking off the balls, and reeling the silk, it will require about the same amount of labor, for the same length of time, as the last mentioned period, which may all be performed by women and children. The aforesaid labor and board may be estimated at eighty dollars; spinning the silk at thirty-four dollars; forty pounds of silk at the lowest cash price, is now worth two hundred dollars, which makes the following result:

40 lbs. of silk at \$5 per lb.	-	\$200 00
Labor and Board,	-	\$80
Spinning,	-	34 = 114 00

Net profit per acre, - - - \$64 00

The principal part of the labor may be performed by women and children; but where the business is carried on to a considerable extent, it is considered more profitable to employ some men for the last period of the worms.

This account of Mr. Fitch, it will be seen, makes no allowance for any capital invested in trees, land, or buildings; or for expenses which the care of the trees, land and buildings may require; and it refers only to the use of the white mulberry as standard trees.

6. The calculation of an intelligent silk-grower at Manchester, Connecticut, and who is a cultivator of the Perottet mulberry, is as follows. He estimates the value of the trees at 25 cents each, and he requires three thousand to stock an acre.

Cost.

Of trees for an acre,	-	-	\$750 00
Value of land	-	-	100 00
Capital invested,	-	-	\$850 00

Interest on \$60	-	-	-	51 00
Labor in picking leaves,	-	-	-	25 00
Labor of feeding worms, and reeling silk,	-	-	-	50 00
Extra manure for land,	-	-	-	20 00
				\$146 00
<i>Return.</i>				
50 lbs. of silk \$5 per lb.	-	-	-	250 00
Deduct charges,	-	-	-	146 00
				\$104 00

The labor here is undoubtedly underrated. The number of trees upon an acre, 3,000, is also underrated, unless upon the presumption that these trees are counted before they are laid down; if laid down in a furrow they would be multiplied many times. In Mr. McLean's case, there were 5,600 trees upon a quarter of an acre, or, 22,000 upon an acre. The price of silk is, in a considerable degree, capricious. The quantity produced upon an acre is matter of fair calculation. I do not rely with much confidence upon this statement; but I give this example for the sake of showing how difficult it is, even with observing men, to arrive at any certain results.

7. T. W. Shepard, of Northampton, fed worms to an amount not known, but supposed from 75,000 to 100,000. Commenced feeding about the middle of August; and the worms wound in about five weeks. The worms were of the two crop kind. About 2,150 lbs. of leaves were picked from small Alpine and white mulberry trees; all the leaves were stripped off with many of the small branches; and owing to the lateness of the season many leaves were very rusty. All the labor of picking leaves, tending the worms, and preparing bushes for winding, was performed by one man in five weeks, except paying a boy three dollars for picking leaves; and the first two weeks, the man was not engaged more than half the time. The cocoons measured twelve bushels; one bushel was saved for seed; and the remainder reeled by a young girl, totally ignorant of the business, having never reeled an ounce before. The amount of silk reeled was eight pounds. Under the most favorable aspect, the cost in this case, cannot be considered less than three dollars per lb. for labor only.

Product of an acre.—Of the yield to an acre, the most various calculations have been made. I should deem myself poorly occupied to go into the extravagances of some persons whose brains on this subject seem to have been turned, if in truth they had any brains to be turned; and should, in the present condition of the silk culture, deem it safe to rely only upon what has actually been accomplished.

Joseph Conant, of Mansfield, Connecticut, trained to the culture of silk from his childhood, and upon whose intelligent and calm judgment I should place much reliance, says, that an acre of land may be expected to produce from thirty to fifty pounds of silk. D. V. McLean obtained at the rate of 48 lbs.; or, allowing for waste and accident, at the rate of 50 lbs. to the acre. He adds, that he should utterly despair of obtaining 104 or 128 lbs. to an acre. Mr. McLean's product, under the circumstances of the case, may be regarded as a medium product; but how much more may be obtained it would be idle to state, until some exact experiments have determined this

important point. I have before me various calculations of 100 lbs. 150 lbs. 167 lbs. 185 lbs. 333 lbs. 666 lbs., to an acre; but I have little sympathy in the hallucinations of those minds which prefer moonlight to clear sunshine. Fifty pounds of silk to an acre then affords the only safe basis on which at present we may make our calculations as to the profit of the business.

Quantity of leaves to a pound.—There are some other points connected with the culture of silk, to which it seems proper to refer. In all cases of this nature, well established facts are what we mainly seek after. When I speak of well established facts, it will be understood that I do not estimate testimony merely by the number of witnesses; for with respect to agricultural matters, as in other matters, a large portion of mankind in what they state only echo the sentiments of others, and they perhaps persons not very competent to teach; and are like parrots, who can utter only what they have heard others say.

It is often stated that one hundred pounds of leaves will feed worms which will make 1 lb. of silk. Aaron Clapp, of Hartford, states, that 80 lbs. of the Perottet mulberry leaves will do it, and this is asserted by many others. I do not learn from Mr. Clapp's conversation or his book, that this result has been reached by actual trial; but like the boy, who had learned his multiplication-table, when asked if he had been through his arithmetic, replied that he had been so far as to see through. The problem, however, has perhaps been more nearly solved by some others, and to their authority we shall defer.

Ralph Storrs, of Mansfield, Connecticut, states, that it requires 200 lbs. of the white mulberry leaves for one pound of silk. Joseph Conant of the same place, says, from 100 to 120 lbs. of leaves will make one pound of silk. I cannot reconcile the difference in the testimony of these two gentlemen, both of whom are experienced in the silk culture; but by supposing that they have never made an exact measurement in the case; or that the former in the weight of leaves included the weight of small branches or twigs, which were collected with the leaves.

I have, however, two testimonies, which rest upon exact measurement. Mr. McLean says, that the whole number of worms fed upon his quarter of an acre was 40,000. The weight of leaves consumed, 2,576 lbs. Amount of cocoons produced, 130 lbs., weighed just as taken from the shelves, without sorting or flossing. After they were sorted and flossed there was 1 lb. of floss and 4 lbs. defective cocoons, leaving 126 lbs. of cocoons. These produced 12 lbs. of merchantable reeled silk, 16 oz. to the lb., and 1 lb. waste, ends, &c. From the above statement it will be seen, that it required between 19 and 20 lbs. of leaves to make 1 lb. of cocoons. Of these cocoons, without flossing or sorting, it required 10 lbs. and 10 oz. to make 1 lb. of reeled silk. After they were flossed and sorted, it required 10 lbs. and 5 oz., or about 214 to 215 lbs. of leaves, to make 1 lb. of reeled silk. These were the leaves of the Perottet mulberry. After making various allowances for waste leaves, Mr. McLean thinks it may require 190 lbs. of leaves to make 1 lb. of silk. The first statement is the result of an actual trial; the latter is matter of opinion.

Mr. Shepard, of Northampton, in an experi-

ment made by himself, the last summer, found that it required 240 lbs. leaves and twigs of the Alpine and white mulberry to 1 lb. of silk. He adds, that had all the leaves been free from stem and rust, probably 200 lbs. would have been an ample supply for a pound of silk. These are the statements of a gentleman of perfect credibility, and the result of exact experiment. They are to be disproved only by more full, more exact, and repeated trials.

To his account Mr. McLean adds: "last year I produced at the rate of 510 lbs. of cocoons to the acre; this year I produced at the rate of 520 lbs.; and my deliberate opinion is, that more will fall below this standard than will exceed it; and in one case, where a less quantity of leaves will give the above quantity of silk, two cases will occur that will require a greater." The exactness, caution, and frankness of this gentleman are worthy of all praise.

Varieties of the worm.—Of the worms used for the production of silk, there are several varieties; some distinguished by a shorter or longer time in which they perform their work and pass the period of their existence; and others for the quality of the silk made from them. The sulphur cocoon makes a coarser thread than some other varieties. The six weeks' worm will yield the most silk. The three weeks' worm can be made to produce two crops, if they are carefully managed; if not particularly attended to they will require four weeks in which to complete their winding. The mummoth white require four weeks; and make two-thirds as much each time as the six weeks' worm. A new and beautiful variety, forming, from its being depressed in the middle, what is called the peanut cocoon, has been much approved, both from the beauty of the silk produced from it as well as from the little waste to which it is liable in winding, it running off in reeling almost without leaving any thing.

Quantity of cocoons for one pound of silk.—Of the number of cocoons required to weigh a pound, or the number required to produce a pound of silk, very different statements have been made. Cocoons are measured in Mansfield, Conn., by the bushel. The measures are evened, or as sometimes termed, struck, and four quarts additional are allowed to each bushel thus measured. The weight of a bushel of cocoons will vary from seven to nine pounds. The quantity of silk to be obtained from a bushel of cocoons will depend on the quality of the cocoons. The weight of cocoons will be affected by the time which has elapsed after the stifling of the moth or chrysalis.

With Mr. Smith, of Amherst, one bushel of peanut cocoons gave one and a half pound of reeled silk. Of the sulphur cocoons, one bushel produced one pound of reeled silk. This shows an extraordinary difference. Mr. Haskell, of Harvard, requires ten to twelve pounds of cocoons to make one pound of silk. With Mr. McLean it required 10 lbs. 10 oz. of cocoons without flossing or sorting, and 10 lbs. 5 oz. after they were flossed or sorted, to produce a pound of reeled silk. He found likewise, that it required 19 to 20 lbs. of leaves to make 1 lb. of cocoons. With Mr. Shepard 13 bushels of cocoons produced 9 lbs. of silk. In Mansfield it is considered a fair task for a girl to pick 60 lbs. of leaves per day; this, it is understood, is from standard trees. From trees in a

hedge row, or accessible from the ground a very much larger amount can be gathered.

Natural and artificial management.—We may yet expect great improvements in the culture of silk. The method of culture to which I have referred is denominated the natural method. In Mansfield the fixtures are of the most simple character. A rough shed or barn is used for a cocoonery; and no provision is made for artificial heat beyond the closing of the window shutters in damp weather. It has been said that electricity will sometimes destroy the worms. Mr. McLean informed me that a heavy thunder storm occurred during his feeding, and the lightning struck in the immediate neighborhood of his cocoonery, but his worms experienced no injury. In Mansfield the worms are ordinarily cleaned three times in the course of feeding, and are fed three times a day. The Mansfieldans are of opinion that a cold is more favorable to the production of silk than a warm season.

By what is called the artificial process, pursued with extraordinary success at the experimental farm in France, under the direction of M. Camille de Beauvais and with the patronage of the government, the whole operation is much abridged in respect to time, and the quantity of silk produced from the same number of worms is considerably increased. The plan is to keep up an even temperature in the cocoonery as high as 75° Fahrenheit, and to feed the worms day and night to the full extent which they can be made to consume. I shall subjoin to this report a table most ingeniously drawn up, in which every step in the process is minutely and clearly detailed. This, in my opinion, will be almost invaluable to the cultivator of silk, as condensing, in a small compass, the most important and useful information.

The Messrs. Clieney, of Burlington, New Jersey, have experimented upon this artificial process, the last year, with success. The worms completed their winding in twenty-four days; and they have strong hopes to reduce the time required to twenty-two days. It is stated that, in proportion to the shortness of the time occupied in conducting the worm to maturity through the various stages, by incessant care, and the most liberal feeding, the quantity of silk is increased and its quality improved.

In the German pamphlet to which I have referred, it is stated that "by this mode of management, M. Beauvais has obtained from every half ounce of eggs, sixty-eight pounds of cocoons, whilst, in the south of France, they commonly obtained only twenty-five pounds, and in the north of Germany, with proper care, from forty to forty-five pounds." By this method, they can bring four generations of silk worms to spin in one year, and so have four silk harvests.

These are certainly great points to be attained. Such refinements in the cultivation, and so much pains-taking, may, by some, be regarded as discouraging; but they involve no mystery, and the extraordinary advantages to be obtained promise an ample compensation for much expense and labor. How far they may be suited to what may be strictly called household arrangements, or where the silk culture is pursued altogether as an incidental or subsidiary branch of husbandry, is a matter of easy calculation, and which any one may determine for himself.

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Reeling and reals.—The reeling of silk is not a difficult but a very nice operation. The objection to American silk has been in the imperfection or faults of the reeling. The perfection of reeled silk consists mainly in the evenness of the fibre. To effect this requires not only care but judgment. The worm in forming his cocoon, pours out the viscid matter from which the silk is made from his nose, and this becomes hardened in the air. At its first coming out it is in its largest form, and becomes gradually more attenuated as the worm becomes exhausted. The filament or thread from a cocoon is from 750 to 1150 feet long. Whatever number of cocoons are taken, to form a thread, it will be larger at first than it would be afterwards, unless care and judgment are used in uniting additional cocoons as the original fibre diminishes in size, in order to keep up the evenness and equality of the thread throughout. In doing this as it should be done, and in carefully uniting the filaments when by any accident they became broken, or are run off, consists the perfection of the art of reeling.

Various reels have been invented for the purpose of executing this work. I have seen three only in operation. The Piedmontese reel is universally admitted to combine simplicity of form with excellence of execution. Adam Brooks, of Scituate, Mass., has invented an ingenious reel by which the reeling and spinning are performed by one operation. It has much merit; but is liable to the objections, which usually apply to machines which attempt too much. In performing two operations it does neither of them so well, as if only one were undertaken at once. The third reel to which I refer, is one made by James Deane, M. D., of Greenfield, of which I have already spoken. It is beautiful from its simplicity and the perfect manner in which it executes its work; and it is likewise recommended by the smallness of its cost. We must not, however, expect to find any machine so complete as not to require a vigilant and intelligent superintendence. Even the human hand, that most perfect of all machines, can very poorly discharge its office without the light of the eye and the guidance of the judgment.

Domestic industry.—Mrs. Brooks, who claims some share in the Scituate reel, to which I have referred, has distinguished herself for her zeal and success in the culture of silk, in which for ten years she has been more or less engaged. She merits most justly a part of that brilliant eulogium, which the author of the Book of Proverbs has pronounced upon a good woman. I do not say that she has not just claims to the whole; but it is not within my province to adjust that account. "She layeth her hands to the spindle; her hands hold the distaff. She maketh herself covering of tapestry; and her clothing is silk and purple."* Mrs. Brooks has produced and completed from the egg three full grown paterus of silk; and considerable quantities of sewings. She surprised me by saying, that if her silk cloth could be sold for one dollar per yard, taking in the whole affair of production and manufacture, she could get one dollar per day for her labor. My surprise, mingled with some incredulity, has not wholly ceased. Her

veracity is beyond question; but something must be allowed for the enthusiasm with which success has inspired her; and if there be no error, yet I fear there may be a little poetry in the calculation. It is almost universal since the introduction and extraordinary improvements of manufacturing machinery, to mourn over the decline of household industry properly so called; to speak of it as we are accustomed to speak of the existence of some ancient cities, as a thing that was, but which has now become purely matter of history; what our grandmothers performed with their own hands, as only suited to point the moral of some story in a winter evening; to consider it now not the province of women to make the clothes but to wear the clothes; and like other beautiful flowers, referred to in the sacred book, with which nature is adorned, though they may array themselves in the gorgeousness of regal magnificence to regard them as no longer doomed "to toil and to spin." The eminent industry of Mrs. Brooks and Miss Rapp will do something towards redeeming the character of our own country-women from a reproach but too often cast upon them by those who seek to find an apology for their own indolence, extravagance, and want of enterprise in the imagined and magnified deficiencies and faults of others.

Manufacture of silk.—It does not properly belong to my report to say much of the manufacture of silk, excepting so far as it is a household concern; and as a manufacturing establishment would afford to the farmers a market for their cocoons. In some places, this would be a great advantage. Several establishments for the manufacture of silk have been erected in Massachusetts and New England. Many manufacturing establishments in New England, some silk among others, have been undertaken upon too large a scale, and too far in anticipation of the actual wants or capacities of the community. Some of them being thus top-heavy have fallen by their own weight; and others have remained like the leaning tower of Pisa, the wonder of spectators, how they sustained their position. The extraordinary caprices of public affairs, and the embarrassments and fluctuations of the currency, and the explosions of many of the banks, which like the bursting of pieces of cannon, prove often most destructive to those who have the handling of them, and scatter their bleeding fragments in the air, have operated greatly against many manufacturing establishments among us.

The policy of the government has not been favorable to the production of silk, if an impost is to be considered as favorable. The removal of all duty upon silks, other than sewings, excepting a merely nominal duty of ten per cent. upon those from beyond the Cape of Good Hope, favors the cheap, ill-fed and unrequited labor of Europe and Asia; but it destroys all competition on our part. The imposition of the enormous duty of forty per cent. on sewings, which it was thought from its magnitude would amount to a virtual prohibition, in its large amount defeated its very object; for in an article embracing so large a value in so small a bulk, and so easy of being smuggled, it amounted, virtually, to a premium on its illicit introduction.

I had however the pleasure of visiting a manufactory of silk at Nantucket, on a small scale, but well conducted; and which it is thought will

* Prov. xxxi. vs. 19, 22.

demonstrate the practicability of manufacturing silk to a profit. The cost of the establishment in this place is about \$15,000. It is calculated under full way, to manufacture 175 lbs. per week into sewings. It is understood that the investment in machinery should pay from nine to fifteen per cent.; that nine per cent. should be charged on the buildings; fifteen per cent. on all perishable articles; and six per cent. on the active stock. The cost of manufacturing, including all extra expenses, is estimated at \$1.26 per lb.; or the manufacturer professes himself willing to take a lease of the establishment from the owner, paying as rent \$2 per pound of the silk manufactured. The raw silk purchased from Smyrna, costs in Boston \$1.28 per lb. cash; the manufactured silk sells for \$8.10, and a credit of four months is allowed. What is technically called the weighting of silk, is increasing its weight by the dye-stuff, which is used. By the use of sumac, the weight is increased from 2 oz. to 3½ oz. per lb. It is said that abroad, a preparation of lead is often used with sewings, both to increase the weight of the silk, and render it more glossy and brilliant. I suppose this may be mentioned with safety, for certainly such an honest people as the Yankees will never think of adopting the tricks of the old countries. It is gratifying to be told that this establishment is expected to give a satisfactory remuneration both to its conductor and proprietor. Yet with these favorable prospects, it does not appear to me, that a sufficiently long trial has been had to determine the points at issue.

The account of J. H. Cobb, of Dedham, which appears to be made with exactness, gives a somewhat different result as to the cost of manufacturing sewing silk. He makes it, after detailing all the various processes, \$2.55 per pound; and here no consideration is made for interest upon the stock, for superintendence, or for any commissions; and undoubtedly, as in all such cases, there are a great many incidentals, which must somewhat increase the cost. We believe this gentleman was soon satisfied that this manufacture could not be carried on to advantage.

With respect to the introduction silk manufactures, other than sewings into the country, as long as foreign fabrics are admitted free from Europe, and from China paying only a small duty, it must be despaired of as matter of profit. The silk manufacturers in Europe, if we except the worms themselves, are the poorest fed and the poorest paid of almost any class of manufacturing operatives on the continent. In 1834, the prices of labor for weaving gileous $\frac{3}{4}$ wide, was one shilling one farthing sterling per groce; this would be a great day's work. At Huddersfield, where 13,000 persons, mostly females were employed, the wages averaged 2½d. per day. At Totmaston, where they worked 14 hours per day, men's labor was at one shilling sterling per day. In the county of Kent, 30,000 persons were employed in the silk-business, at 6d. per day. The prices, it is presumed, have not since advanced. In Lyons, the wages of men in the silk business is less than six shillings sterling per week, and of girls not more than three shillings per week. The salary of an overseer is about seventy-five cents per day. The wages in the silk districts in England, when the condition of the business is spoken of as prosperous, varies for an adult, from three shillings to

eight shillings sterling per week; and as the article is matter of mere luxury, though of almost universal use, the fluctuations in their condition to which these poor creatures are subject, from the changes and caprices of fashion, often reduce them to extreme distress. We can easily suppose, that in some cases, they may wish they had the power of the humble insect, whose winding sheet they unravel, of enclosing themselves in a cocoon, from whence they might emerge with wings which should bear them away from their ill-requited toils and unpitied sufferings.

We cannot contemplate such facts without exulting with religious gratitude, in the superior compensation, and, in general, the extraordinary prosperity of labor, in our own country. But if we undertake the manufacture of silk, while trade is free, we must come in competition with such rates of labor. Is it to be supposed that we are ready for this? The benevolent mind would reluct at taking the bread from those mouths which get nothing, excepting bread, and scarcely enough of that, to keep their teeth bright, or their hearts from aching; especially when our country offers to those who will work, fields of labor far more favorable to health, comfort, competence and morals.

(To be continued.)

LIME AND LIME BURNING.

From Prof. Ducatal's Geological Report of 1839.

A very striking experiment, that speaks volumes of encouragement to those who still hesitate in the use of lime, is furnished by the Hon. Outerbridge Horsey, a part of whose farm, situated at the foot of the south mountain, on the edge of what is termed "the Maryland tract," consists of a very thin silicious soil. It is this, of two species of ground, both of the same geological character and nearly in equal arable condition, one was limed with fifty bushels to the acre, the other was well manured without lime, and both planted in corn. The limed portion, previous to the operations, was remarkably poor, yielding at most two barrels the acre. It promised in the month of August, to the eyes of some experienced farmers, to yield to the acre eight barrels of corn, which to all appearances was one third better than on the manured portion. But besides the prejudice that exists against this use of lime as regards the incapacity of certain soils to receive any benefit from it, it is most generally objected to as too expensive; whereas in truth it is, taking all circumstances together, the cheapest as well as the most effectual means of improving all kinds of soil, which assertion will, I trust, be manifest by these two considerations, namely, that it is the surest and most permanent. If judiciously employed, the directions being simple, as will presently appear, the expenditure of capital in the first year cannot fail to be at least repaid by the additional product of the next, and nine times out of ten will supply the means of extending its further use in future years. Judgment and reflection undoubtedly must accompany this as well as every other scheme of improvement that could possibly be devised for any purposes.

Having taken especial pains to inquire minutely into the subject, referring not only to the results

obtained by experience, but to the cause that may have produced these results, I hazard the following suggestions to the farmers of Frederick county, and the recommendation applies to all other portions of the state. Get lime, at almost any expense, and apply it according to the nature of the soil as is herewith directed. If the soil is naturally a good one, and under good cultivation, it is advisable to apply at once the whole quantity of lime which may be judged necessary permanently to improve it, and this quantity on such soils need not exceed one hundred and fifty bushels. Should it be impracticable or inconvenient to procure in the same year the whole quantity, from fifteen to seventy-five bushels may be first applied, and the remainder two years afterwards, after the first cutting of the clover. These directions apply to wheat land, on which it appears preferable to turn in the vegetable matter first, then apply the lime, to be harrowed in subsequently. On corn lands the method that has been crowned with the best success, is that pursued by one of the most thrifty farmers of Carroll county, Mr. Jacob Schriver, which is to mix the lime in the soil with stable manure. In this way, he informs me that he has obtained very heavy crops upon poor land, with only from forty to fifty bushels of lime. In general, for unimproved land, it is always better to turn the lime in with stable manure, and when not so provided, with any vegetable matter that may lie in the soil. A good plan is to turn the lime in with the sod, sow buckwheat, and when in blossom return it to the soil, furnishing in this way vegetable matter for the lime to act upon. In this latter case, the returns, though certain, are not so speedily to be expected. Those farmers who burn their own lime, should not neglect to use the refuse of their kilns in making composts with alternate layers of it, and of whatever vegetable or animal matter they can bring together. These, when properly mixed up, and comminuted, are to be used as ordinary manure. The foregoing directions apply to all sorts of soil, whether they be on limestone lands, red lands, chestnut lands, or any kind of lands, whatever be their color, texture, or other physical character, provided there be soil enough to support any sort of vegetation.

I have in former reports given my theory of the action of lime, and although farmers are more immediately interested in the results of its application, they cannot fail to employ it more judiciously, as well as other manures, when they understand the reciprocal action that takes place between these and the plants which they wish to cultivate. I shall therefore introduce here a few simple notions of vegetable physiology, and repeat again what I conceive to be the mode of operation of lime. Every one knows that plants have not the power of creating new elements, which they at most can assimilate and elaborate so as to form new compounds out of those derived from the earth, air and water in which they live. Accordingly, the result of a chemical analysis shows that all the earthy and saline matters contained in them are traceable to the earth; whilst by their destructive distillations, they are found to yield gases, that form the elementary constituents of air and water. The principal solid constituent of vegetables is carbon, or charcoal, which vegetable physiologists assert they derive in the first place from the carbonic acid gas of the atmosphere, and from the fermentation of

the animal and vegetable substances that during their progress of decomposition in the soil also yield this gas, and is supposed to be either decomposed by the leaves of vegetables, or absorbed by their roots when in a state of aqueous solution. It is found that when a plant is allowed to grow under a glass receiver, containing a mixed atmosphere of carbonic acid gas and oxygen, the former gas is gradually absorbed, and nothing but pure oxygen remains, and this process of vegetable decomposition goes on more rapidly under the influence of the solar beams, for during the night the reverse takes place, though the quantity of carbonic gas which they emit is trifling, compared with that taken up in the day. Thus plants are constantly removing from the atmosphere a gas known to be deleterious to animal life, though necessary to themselves, and replacing it by one essential to both man and brutes, exhibiting a most admirable provision of nature, to which we must refer that healthfulness of a country life, which, combined with active exercise and the enjoyment of rural sports, makes the mere consciousness of existence a pleasurable sensation. It is also an admitted opinion among vegetable physiologists, that plants have the property of secreting from the soil that sort of food which is most congenial to their own wants, whilst they, at the same time, excrete, or throw off, that which is best suited for their own growths. If this doctrine could be well established by experimental results, the pursuit of the agriculturist would become a science founded upon an immutable basis, and a consistent system of rotation in crops would secure to him a perpetual recurrence of good crops. But it must be acknowledged that this is the most obscure department of vegetable physiology.

As to the action of lime, or rather carbonate of lime, I can conceive it to operate in three important ways. 1st, As a neutralizer of any acidity of the soil which renders it prone to throw out acescent growths, such as sorrel, pines, briars, &c., that interfere with the production of plants that afford farinaceous seeds, in which case it may be supposed, by a new combination, to give out its carbon to the growing vegetable. 2d, As an amender of soils; since it undoubtedly contributes to stiffen a loose soil; and gives body and consistency to a porous and sandy one, thereby improving its physical condition. And, 3d, as a septic or decomposer of the vegetable matters that may have existed in, or been applied to a soil, reducing them into soluble compounds fitted to this nourishment of vegetable life. These I conceive to be the most immediate benefits derived from the application of lime; but it would seem to act also beneficially as an absorbent of moisture, for it has been found to protect soils from the pernicious effects of a drought, and when used for making compost, its utility and action are easily understood as explained. When applied in alternate layers, with stable manure, or vegetable manure, or vegetable and animal matters of any kind, a powerful fermentation takes place, which gives rise to the formation of a compound called ammonia, and to the production of carbonic acid. A reaction soon takes place between two substances, and a carbonate of ammonia is thus formed, together with numerous other salts; and the whole mass is converted into powerful manure. Lime is further serviceable to the farmer, by enabling him to

destroy the insects and the seeds of weeds that frequently accumulate in the barn yard manure; for by applying it in its caustic state in alternate layers with the manure, sufficient heat is generated to destroy them effectually; and this operation produces, moreover, a variety of soluble salts, that increase the action of the manure, if it be used before they have been removed by rain. There is another combination of lime which is very valuable to the agriculturist; it is that in which it exists in bones, that are principally composed of phosphate of lime. Most extraordinary results have been obtained by the use of ground bones as a top dressing, especially on buckwheat crops.

It follows from the above consideration, that it is a matter of much importance to the Maryland farmers, to obtain lime at as cheap a rate as possible. Desirous of serving them in this way, I have turned my attention to the subject of lime-burning; and after reflecting upon the theory of the operation, and consulting the practice of the most experienced lime-burners in the state, I think I am enabled to give some simple directions, the observance of which will have the desired effect.

In the first place, as regards the construction of the kiln, I recommended that it should be in the shape of a truncated egg at both extremities, with the but-end downwards, contracting the upper extremity, so as to make it act in the manner of a reverberatory furnace. Its shape should be very symmetrical, with a view of securing a uniform draft in all parts; and it should be built with solidity, of the most refractory material, with an elevation of about twenty-two feet, and a bulge at its greatest diameter of eleven feet. A kiln of the size will burn from 1,000 to 1,200 bushels of lime.

Next in conducting the operation, which, according to the present practice, lasts at the least three days and three nights, all lime-burners agree that on the morning of the third day, their kilns become choked up by something which prevents the formation of fresh lime, and during the whole of which they are burning wood apparently to no purpose. The cause of this choking, when the kiln, in popular language, is said by some to be "soot," and by others "glued," is owing to the accumulation of that peculiar gas which it is the object of the burning to separate from the lime, in order to bring it into a pulverulent state. This carbonic acid gas, as it is termed, is very heavy, so that where it has thus accumulated, it forms a dense atmosphere, binding round each unburnt portion of stone, and thereby impeding the progress of its calcination. It is true that by urging the fire, the gas finally becomes so rarefied as to be expelled; but this is the unprofitable part of the labor, which may be avoided by simply throwing some water over the kiln. The water immediately absorbs the gas, the kiln is relieved, and the calcination proceeds as rapidly as in the first stages of the progress. In corroboration of this view, I have found that it agrees with the experience of several observant lime-burners, one of whom informed me, that on an occasion, when his kiln was in the condition above described, his hands becoming impatient at the delay of their expected results, he thought themselves of ascending to the top of the kiln and fanning it with their hats, and were surprised to find their operations, by this simple act, greatly hastened. The effect was evi-

dently, in this case, to remove by ventilation the dense atmosphere of gas, as previously stated, that by its pressure prevented calcination of the limestone. Another tells me that, under similar circumstances, the same phenomenon was produced by the timely occurrence of a shower of rain.

If our lime-burners then will adopt the plan of kiln described above, and resort to the simple device just suggested for expediting their operations, I have not the least doubt that they will find in it a saving of one third of their time, labor and fuel; and by so doing they will be enabled to afford this most invaluable material at one third less than its present cost, putting it thus within the means of a much greater number of farmers, to reap the benefits to be derived from its use.

THE EARLIEST NOTICES OF SILK CULTURE OF THIS SEASON.

It is yet too early to know much of successful operations in rearing silk-worms this season, because few such are yet fully completed and the results ascertained, and none on a large scale. But it is not too soon to have heard of many disasters and losses, and even of total failures of rearings attempted with insufficient preparation and means. Scarcely one experimenter in twenty has been properly provided to guard against the usual changes of weather and usual degree of inclemency; and much less so in regard to this season, which, to this date, (June 17th,) has been generally very unfavorable to silk culture, owing to the predominance of either cold or rainy, or cloudy and damp weather. Indeed, the weather of the months so far have been almost reversed, or each month having the weather that properly belonged to the next preceding or succeeding. In February, the weather was warm and clear enough for the usual warm parts of March; and the young mul-ticaulis trees generally were in leaf in the tide water region some weeks before the usual time. In March these first leaves were generally killed, and there was severe frost, and ice. In part of April there was very warm weather, which either caused too early hatching of silk-worms' eggs, where not safely and properly retarded in ice houses, or invited new experimenters to hatch out their main broods, as for settled warm weather. Again, in May more than two-thirds of all the days were either cold, cloudy, showery, or of settled rain. Even in June, so far, with some very warm days, there have been several others requiring fires for comfort.

Every person who has had the slightest experience of the rearing of silk-worms must know that it is necessary to be able to protect them from cold, and still more from dampness of the atmosphere. And even should they be able to with-

stand much exposure, and yet be healthy and productive in spite of all neglect and ill treatment, that it is true economy to use effectual means to shut out damp air, and, in bad weather, to dry, warm, and renew the air of the feeding apartment, by using a little fire in a fire place, or a stove. Yet almost all have neglected to observe these necessary conditions of success, and therefore it is not to be wondered at that all such feeders have met with either partial or total failure in broods hatched in April, or the first days of May. On the other hand, we have heard of no person who had a close feeding house, and yet well ventilated, and who used fire in the worst weather, who has not so far done well, excepting in some partial cases of the use of bad eggs, or some other well known and sufficient cause of failure. If every person who has attempted and failed to raise a healthy brood this season were separately examined as to the causes, there is no question that in every case there would be found to have operated one or more of the following insuperable obstacles to full success; viz., eggs from unhealthy stock—early hatching and exposure to the cold and dampness and frequent and violent changes of the weather—wet food given during wet weather and on damp litter—or too close crowding of the worms, and neglect of cleaning away their litter. Yet there will be some persons who have permitted all of these evils to operate, and who nevertheless are astonished at their failure, and totally discouraged from making new and better directed efforts.

Many experimenters also who have acted more judiciously, and still more of those who have been too fearful of failure to commence any experiment, will be discouraged by the number of these losses. But there is no ground for such a conclusion. It is certain that this business is capable of being reduced to precise regulation, and conducted always in the same manner. If, then, there were a far greater disproportion of failures compared to successful rearings this season, it would furnish no argument against the business as properly conducted, provided there were any well conducted and certainly successful experiments made in the same unpropitious season. If indeed but one person were to be undoubtedly successful, and 500 others were as certainly unsuccessful, it would be clear that all these might have done as well as the one, if they had but used equal care, and pursued the same method.

Having suffered in one, as well as having heard of sundry other cases of such early disasters, we were desirous of seeing the operations of some other persons who had been more discreet and therefore more successful; and accordingly we vi-

sited the cocoonerics of Mr. Curtis Carter of Henrico, near Richmond, and of T. S. Pleasants, at Bellona, between the 9th and 12th of June. We earnestly recommend to every one who feels interested in silk-culture, and has doubts as to its practicability, to make a similar visit to culturists who have taken some care, and exercised some judgment, to attain the end in view. No one can view the operations of an intelligent and judicious person in this business without seeing and learning something of value, even though some errors may also be equally obvious.

Mr. Curtis Carter has done more and earlier to show his confidence in the profit of silk-culture than any one in Virginia under similar circumstances. He commenced more than a year ago a cocoonery 130 feet long, 30 wide, and two stories high, which has already cost him more than \$4000, and which he does not consider finished until it shall be supplied with stoves and flues, and is lathed and plastered, to preserve the dryness and warmth of temperature thus to be obtained. Mr. Carter is not an enthusiast. He is a prudent and judicious old man, who has earned by his own early labor and economy a competent fortune, without abandoning the habits of industry and frugality, and plainness of his comfortable living, which were necessary in his early life. His prudence and caution are apparent in his present operations. For after being so well provided, and at such great expense, he has still avoided increasing his rearings otherwise than very gradually. He took care not to hatch out many eggs until recently, and the early small broods, (of which he was then reeling some of the cocoons,) were raised mostly in his close brick hatching apartment, where fire served to secure a sufficiently warm, dry, and purified atmosphere. Though 10 ounces of eggs had then been hatched, most of the worms were as yet young, and his great cocoonery seemed almost vacant.

Reeling was then going on, upon two iron Piedmontese reels. The laborers were Mr. Carter's sons and daughters, who already reel well, though having had but a few weeks' practice, and without having seen the operation before, or having instruction from any one more experienced. The principal material used had been the last years' crop, between 30 and 40 bushels of cocoons made by Mr. Carter last summer. During our visit, the reeling was of cocoons of this year's product. We are not able to judge of this operation by comparison, or by acquaintance with the article prepared; but to our scant lights on the subject, it seemed that the execution was easy and rapid, and the product excellent. Those who consider the difficulty of reeling as the great obstacle to silk-

culture, will have that impression entirely removed by seeing the operation here.

It is not our purpose to describe the particulars of Mr. Carter's feeding operations, which, indeed, there was not time to observe carefully. He, as well as other persons to be mentioned, promised to furnish, for the Farmers' Register, detailed statements of results, having especial regard to the labor, the cost, and the products.

Mr. Schermerhorn's cocoonery being immediately on the route, was also visited. His building is 70 feet by 30, and of two stories. It was especially built for this purpose. The warming, in worst weather, is as yet but insufficiently and unequally effected, by a small common stove. An additional building, for the hatching room proper, is now in the course of construction. Mr. S. had hatched out the worms from 30 ounces of eggs, and they so far were in good condition. But the quantity is too large for the means and degree of experience, and we greatly fear a failure on account of that error, which so many others have also committed. With one fourth of the quantity, we would be very sure of the success of Mr. Schermerhorn's arrangements and labors.

At Bellona, the principal cocoonery in the main building, which is ready for use, had not been occupied. A smaller building, because more easily warmed, had been fitted up in a rough manner for the early broods. Of these, about 70,000 worms were in their last age of feeding, and some eight or ten small separate broods had finished spinning, and the earliest of them were then laying eggs. About 200,000 more were hatched but recently. All so far had succeeded well, with the exception of two particular parcels, (out of some 15 or more of different kinds,) which had turned out badly. Altogether, the success was abundantly gratifying and encouraging. Yet great disadvantages had been, and even then were suffered, in regard to the out-door laborers, which it is expected will soon be rectified. When Mr. Pleasants' subsequent feedings begin, in his large and admirable cocoonery, there is every reason to expect success, if zeal, care, and devotion of the head of the establishment can secure that result. So far, the superintendence and the credit for the success of these early operations, are indeed not Mr. Pleasants'; but belong to his sister-in-law, Miss D. Brooke, who has given to the rearing her continued and untiring care and labor. Seeing her success with these early and various small broods, (which caused so much the more difficulty, added to the generally operating difficulties of the weather,) induced us to beg that the like assiduous attention might be bestowed on a single and larger brood, and in a later and better season. We hope

to be enabled hereafter to report the result of this rearing, which will be carefully observed and all the facts noted, in accordance with our suggestion and request.

One of the objects of Mr. Pleasants, in the early part of the season, (the best for the purpose in view,) is to provide eggs of all the best known varieties of silk-worms, and of healthy stock, and likely to produce healthy progeny; and this can only be secured by breeding from a healthy stock. This was the cause of his having so many different kinds of worms, and kept in separate and distinct lots. Much has already been lost by many individuals, from their own ignorance on this subject, and much detriment caused to the progress of silk-culture. Even the best informed and most experienced persons have yet much to learn on this branch of the subject. Very few persons take the care necessary to produce perfectly good eggs, or know what means should be used to retard their hatching afterwards, without injury to the vigor of a before healthy stock. It is a remarkable fact that the constitution of a diseased or feeble brood of silk-worms will certainly be transmitted to the next generation, even though the eggs shall hatch as well as of the best. We are further induced to believe that a neglected and much exposed and suffering brood of worms, though not thereby rendered unhealthy themselves, will lay eggs which will produce only a diseased and worthless progeny. Mr. Pleasants' operations in this respect are conducted with a degree of care and of rigor, which has been rarely if ever used in this country; and not only would he reject the whole of a diseased brood, but, of broods generally healthy, first every suspected worm is rejected, next every soft or otherwise inferior cocoon, and finally every feeble or inferior moth, should any such appear after the previous rigorous mode of selecting the best individuals. If such care can lead to the result, he will scarcely fail to reach the designed end of securing perfectly healthy and pure stocks of eggs of all of his different varieties of silk-worms. He has also been conducting a course of experiments in retarding the hatching of eggs, in an ice-house, (the means which, by being improperly used, have so often produced disappointment and loss,) and from the results already obtained, he is confident of being able to secure both the desired objects, of retarding the hatching to any time of the season, and yet preserve in perfection the vitality and the health of the stock.

The larger apartment at Bellona, already fitted up for the regular feeding, and soon now to be occupied by silk-worms, is 96 by 31 feet, and will furnish accommodations for 400,000 silk-worms at a time. Mr. Pleasants designs to hatch out 100,000

every 10 days until late in September. One such supply has been already hatched, in addition to the more advanced lots above named; and the eggs for the next succeeding brood have been taken from the ice.

So far, no particular facts have been stated of feeding operations except such as we saw, in some one or other stage of progress. In addition, we have been informed of several large, successful and altogether satisfactory rearings, in Brunswick, Amelia, Nottoway, Goochland, and in Norfolk county; though to the account from the last, were added statements of numerous losses having been suffered by reliance on diseased or damaged sale eggs. We had anticipated this result, from having obtained and made early trial of a small supply from the same source. From those experimenters who observed and noted their operations with sufficient accuracy to show the facts and their value, we hope to have reports of the results; and especially as to the amount of labor employed, and other costs, and the products actually secured. We shall not attempt to anticipate any of the reports by partial and probably inaccurate statements of what we have heard of them—or even of what we have seen. But as it may yet be in time to guard others from disaster and loss, we will merely here remark, that all the observations made concur in showing that among the things absolutely necessary for success, are plenty of fresh and renewed air, enough space for the worms, and cleaning of the shelves so often as to prevent any accumulation of damp or fermenting litter at any time, and still more frequent cleanings during the last days of feeding. And, though not so fatal in effect as neglect of those essential requisites, we will add as things to be avoided, the almost universal errors of feeding too heavily, and the use of very young, very luxuriant and succulent leaves, forming a very watery and therefore weak food, and serving to produce or increase dampness, which is the greatest of all causes of injury to silk-worms.

Since the above was written, the later and more full information received (to June 25th) has been still more encouraging, and the cases of success in greater proportion to the contrary. Some persons also who failed totally in their first, and too early trials of this season, have already advanced so far and so successfully in a second rearing, as to consider all danger over. Still, we deem no such operation as ended, and its worth known even to its conductor, until the cocoons are taken down, assorted, and measured.

We have conversed with, or heard from sundry persons who have failed either partially or totally, in rearings this spring; but, with a single exception

only, the causes of failure were perfectly obvious to each individual, (and generally admitted to be the effect of bad management which might have been avoided,) and there was no discouragement, or change of opinion produced, as to the ultimate and general results of the business.—ED. F. R.

THE SECOND PHYSICK HUMBUG.

"It is stated in the Germantown (Pa.) Telegraph that Mr. Philip Physick is now feeding, in his Highfield cocoonery, six millions of silk worms, and that he expects to feed fourteen millions more, making twenty millions in all, the present season. At present (as the Telegraph states) only two hands are engaged in the building, though a large proportion of the worms are winding, and some are three weeks old."

If the foregoing paragraph (which is now going the rounds of the newspapers,) is, indeed, (as we have no reason to doubt,) from the Germantown Telegraph, a paper published on the spot, and the statement was authorized by Mr. Philip Physick, then that individual has sent forth a silk-worm-feeding humbug that is almost equal to his famous (or infamous) multicaulis sale at the same place last autumn, and which we, (as well as most other persons,) were so credulous and foolish as to believe, (for a few days,) to have been a *bona fide* transaction; and as such republished the report of the prices stated to have been obtained. The only excuse we had for believing in the very strange facts reported, of such enormous prices being obtained at public auction for Mr. Physick's *morus multicaulis* trees, was that we then supposed it utterly impossible, not only that a man of great wealth and dignified connexions, and of high standing in society, should, for gain, commit so gross a moral fraud as the opposite facts would indicate, but, also, that he could secure the aid of any auctioneer of decent reputation, of clerks, of *respectable* bidders, making some twenty or thirty persons at least to aid in carrying the deception into effect; and further, that such a deception could be practised publicly before thousands of intelligent spectators, and that neither any of them, nor any of the business community of Philadelphia, should detect the trick, or if knowing it should not expose it to the public. On the contrary, the report of the sale was published as if true by every paper in Philadelphia and almost of the United States, and if any express contradiction of its truth was ever afterwards made, it has never reached our eyes. Yet, in two weeks after the publication, not an individual in the country remained deceived on the subject. This pretended sale was the last blast blown to swell the multicaulis bubble, and served to burst it effectually. And

though a like farce was soon after attempted in another great auction, by another multicaulis magnate, and of which heavy sales at high prices were published, no one was then so foolish as to believe in the truth of the sales, even while the auctioneer was crying the pretended bids.

Since his great and memorable sale, we have heard nothing more of Mr. Philip Physick, and had supposed that he had sunk into deserved contempt, and that he courted obscurity as his only remaining shelter and resource. But from the annunciation above copied, (if he is indeed the authority for it,) and which is scarcely less a humbug than the former report of his great multicaulis sale, it would seem that there is some new cause for his again seeking notoriety, and some new gain hoped for from thus publishing the unequalled and almost miraculous labors of the "only two hands" in the Highfield Cocoonery.—ED. FAR. REG.

MANURE FROM LEAVES. COW-PEAS.

From the Carolina Planter.

Mr. Editor:—As my signature denotes, I am more disposed to live comfortably, than to grow rich inconveniently; and the sentiments of my former piece evince that I am unwilling to derive more from my soil, than will leave it unimproved. It will scarcely prove a matter of surprise, therefore, that I treat in this article of what, to the enterprising, may seem a small matter.

My object is two old: first to exhibit to those, who, like myself, live where land is dear, and therefore valuable, an economical and convenient mode by which a large field may be planted, and yet improved, every year; and secondly, to invite all, who like myself again, (for I address those particularly who are similarly situated with myself,) are subject to the ravages of the chinch bug, to participate with me in the advantage of a crop which they will not molest, and which though equal to the same amount of corn or oats, is not appreciated nor enjoyed by the upper districts. I mean the cow-pea.

In the accomplishment of my first purpose, I will merely describe my own operations, as an illustration of the plan proposed. I have a parallelogram, 150 feet by 50, enclosed by a straight fence, in the midst of which, is a low house 96 feet by 24. A part of this is divided off into stalls for milch cows, in which they may be fed separately from the herd. The balance is open, with a rack running through its length, and dividing it; and the whole is surrounded with unsheltered margin, which prevents the stock from being necessarily confined within the limits of the building.

As soon as I lay by my crop, I haul out my bulk of manure, and deposit it in heaps around the field, or fields, for which it is designed; and then, having my laboratory empty and ready for operations, I commence the preparation of another supply.

First—I cover the whole area, in and out of the house, eighteen inches thick with oak leaves and pine straw—the common litter of the woods—which it takes me, with two horse carts, at 15

loads a piece a day, four weeks to accomplish. My first deposit, then, is 720 loads, gathered into heaps, and conveyed to the pen, in the following manner. As soon as I cease to work my crop, I put all my women and boys to "raking trash," by way of getting a start. In a few days I discontinue this operation, only keeping two elderly women to prepare for, and load the carts, which have been running from the commencement of the "trash raking." These carts are driven by boys, as experience proves that they will perform more, at that particular kind of business, than the prime men. To ascertain that the task (with me 15 loads—but dependent, of course, upon circumstances,) is given me honestly, I make the drivers empty the loads touching, but in distinct and undisturbed heaps, which remain so until I or my agent count them, and inspect their size. The carts are not stopped for four weeks; and consequently the two old women and the two boys take no share in stripping and curing fodder.

When I have my deposite complete, I adjust and level the whole, which will give a coating of not less than 18 inches deep. This I cover with the offal of my stables, which I have purposely delayed to cleanse. And this operation of cleaning my stables, and spreading their contents in a layer over the area of my cow-pen, is performed monthly. In the mean time my pen receives nightly additions from my stock of cattle, which are penned regularly throughout the year. Thus I make a compost which is stronger than cow-pen manure, and not so heating as stable. Directly after the Christmas holidays, and before I commence to plough in my oats, I devote a fortnight to the same operation that I described as occupying the two carts, and their four attendants, during the month of August. And after this I continue the process of strengthening the compost with the cleansing of the stables. As I have sides, a front and back, made of light laths, temporarily attached to my carts, while I am hauling trash—each load, light and dry as it is, and trampled down into the frame, will give a load of manure; and therefore on the first of each August, I have (720+360+220+the monthly cleansing of the stalls of 20 horses,) 1300 thirteen hundred loads of compost to haul out. Of this I find that sixteen loads to the acre are sufficient not only to keep up, but to improve my clay lands. Thus the reward of my labor and trouble, is the ability to plant every year, and yet improve eighty acres of land.

Suppose I did not pursue this system, and what would be the consequence! I must either till that area to less and less profit every year, until I destroy its value entirely; or I must have an equal additional area with which to alternate it, and so be enabled to keep up both by resting. Eighty acres of land in my neighborhood, at \$15 per acre, will cost \$1200; and thus, besides the gain of an annual increased product, the saving of an investment of \$1200 is made. And at what expense? Some trouble, I confess, but no loss; for no labor, human or brute, is subtracted from the preparation for the planting, working, or harvest of, the crop.

It would be very easy to increase the quantity of manure made in this manner, if my means were more ample; but I am limited, both in the quantity of my available trash, and in the number of my cattle.

A few lines now, Mr. Editor, in fulfilment of my second design. Before the chinch bug made its appearance amongst us, it was easy enough for every farmer to raise as much corn and oats as his wants required. There was no occasion to cast about for, and bring into requisition, auxiliaries to those two staples of plantation support. Sweet potatoes, like the Irish, were regarded (as they unfortunately are even now,) as mere garden vegetables—a mere luxury, not a necessary; and cow-peas were considered to cost more in their harvest—occurring as it does in the midst of the cotton picking season, than they were worth. But a change has come over the face of things: and we must now harvest, at any cost, what our remorseless enemy will permit us to produce.

I regard it as impossible to devise means for the destruction of the chinch bug, as it is to account for their origin. Their whole existence is a mystery; and, if I may be allowed to use a seeming paradox, they are collectively the more formidable, from their individual insignificance. All that remains for us to attempt, then, is to counteract their tendency to reduce us to famine, by planting a variety of crops, and especially such as are exempt from their ravages.

Last spring, about the first of May, I planted seventy-five acres of my corn in cow-peas, and from them gathered, in the fall, a sufficiency of grain in the horns or pods, to sustain twenty animals, exclusively, for seven months; besides that those which were shelled by hauling were given to my negroes. The only additional labor they cost me arose from having to plough but one way, (which I regard as an incidental advantage to my land,) and the harvest, which occupied ten or twelve days in the fall.

They cannot be made in perfection, in the up country, if planted after the middle of May, I am convinced, by experiments made five years successively. Many, to save labor and trouble, plant them while laying by the corn; but I have never seen the attempt successful; nor ought we to complain that it is so, for in that way they would be made too easy to leave man's curse in operation. Nor do I approve of planting them on the side of the ridge, or in the centre of the middle; especially in the latter place, from which all the soil has been previously withdrawn. My plan, and it is borrowed from the invariable custom of the low country, where the pea crop is proverbial, is to drop from 6 to 9 grains between, and in a line with the corn, which stands 4 feet apart on the beds.

In the up country there is a prejudice that peas are unwholesome food for horses; but the experience of the whole low country is opposed to this theory.

A FRIEND TO MODERATION.

June 5th, 1840.

GREEN MANURES. BUCKWHEAT.

From the Cultivator.

Manures cannot be conveniently carried to all parts of a large plantation. They should therefore be applied to the fields near where they are made; and the more distant fields must be enriched with green crops. Tares are much used for this pur-

pose in Europe, but whether these would grow as rank and as rapidly in our dry climate, we are not certain. We think they have not been extensively tried.

Oats have been sometimes sown to be ploughed in, but they give only a small layer when the land is poor. Rye will grow on poor soils, but we must use much seed, or we must let it grow tall, else we have but little to bury with the plough.

Round turnips form a good green crop for the plough, but they will give no top in poor ground. Indian corn has been recommended and partially tried. This is not more exhausting than oats or rye, and on fields not worn down low, probably no green crop would furnish more matter to be covered by the plough, than this one. But on quite exhausted land, this would not answer our purpose; and the quantity of seed necessary for such a purpose, would be four or five bushels, quite an objection with economists.

Buckwheat is a grain that will grow on most poor soils. It delights most in dry locations, a soil inclined to gravel or sand. It has many qualities that recommend it highly as an article to be grown for the purpose of filling the soil with vegetable matter, of which it has been much exhausted in the states of which we have spoken.

In the first place, it will grow and produce a handsome layer for the plough, on lands that will produce nothing else. In the second place, we do not find it an exhausting crop. We can raise it many years in succession on our poor lands without any manure, and we very commonly save fifteen or twenty bushels of the grain from an acre. This plant has a very small, fibrous root, and is easily pulled up by hand. It has also a large branching top that never could get its support from this root. It has therefore probably greater facilities for procuring nourishment from the atmosphere, than most plants have.

All theory and all experience unite in showing that this plant takes less from the soil, than any other of the same size. In the next place, it has a rapid growth, six weeks, in Massachusetts, being long enough to bring it in full blossom, when it should be ploughed in. Three crops may therefore be turned under in one season in Virginia, and then it will be early enough—(Sept. 1st)—to sow down with grass seed.

Another advantage attends the raising of this for grain or for green crops; the expense is not great. It usually bears the same price as our best corn, and is worth quite as much for fattening animals, and one bushel of seed is enough for the acre. When it is raised for the purpose of saving the grain, we often sow but half a bushel. The straw is also greedily eaten by the young cattle and by horses—colts may be wintered on it. Yet we have known large piles of this straw to be burned in the field where it was thrashed!

Now with this article—this old, neglected, abandoned, and abused buckwheat—we could soon renovate the once beautiful plains, formed from the washings of the gulf of Mexico, and laying between the Alleghany ridge and the Atlantic ocean. Much of this fine tract has been cropped, time out of mind, while nothing was grown that could make any adequate return for what was abstracted.

The natural advantages of this tract of country are superior, in our humble opinion, to the far-

famed west. And though the soil has been mismanaged and abused, a few years of correct husbandry would again restore it to its pristine value and importance. No critical niceties need to be observed, no nicer labors than the blacks are capable of performing, are required to bring these feasible soils again to fertility. And when they are brought to that state, there is no difficulty in keeping them there.

None of the various grasses are great exhausters of the soil, and grasses must form one of the series of the rotation of crops. When lands are kept half the time in grass, the roots fill the soil with vegetable matter that turns to manure directly on being turned by the plough, and, by means of raising more grass, more stock may be kept, and that increases the quantity of animal manures.

The policy of raising so many acres of corn on reduced land, must be abandoned. When more buckwheat can be raised on the acre than is obtained of Indian corn, it should be substituted for corn in a great measure, for it requires not a sixth part of the expense to produce it—and when buckwheat is raised for its grain, if proper care be taken to sow something with it that may be turned in for a green crop in June, the land will prove more productive, year after year.

On the wet and clayey lands of that district of country buckwheat may not be sown. Such lands may be treated as we treat our grass lands of that character at the north. They may be turned over in autumn and seeded down again directly to grass.

ON THE CULTURE OF LUCERNE.

From the Albany Cultivator.

Respected friend, Jesse Buell—I some time since received a letter from thy father, requesting me to give him such information as I am possessed of respecting the culture of lucerne; and thinking thou wouldst like to have it, I have concluded to send it to thee, as I think every farmer who has land suitable for it, ought to have plenty of this valuable grass. It requires a good deep soil, that has not clay bottom. I have succeeded beyond my expectation, and now find no more difficulty in raising it than any other crop. In order to prepare the land for it, spread plenty of unfertmented manure on it, and plough it in and plant corn, which ought to be well managed, allowing no weeds to grow. After the corn is taken off, give it a good deep ploughing, and let it remain in that state until spring, if it be sown with barley; but if with winter wheat, harrow it well, and collect the roots and loose stones, and should there be any fast stones they ought to be removed; then spread about forty bushels of ground bones per acre and harrow it in; but if bones are not to be obtained, any good rotten manure that has no seeds of weeds in it, will answer it. And as it is best to lay the land in ridges about 24 feet wide, open a furrow about 12 feet from the fence, and let the near horse return in it; then open another in the same manner, 24 feet from it, and so continue until the whole is finished; then sow the wheat and plough it in, not very deep, filling the

furrows which were opened, and harrow it once over. As it is best to have it as smooth as may be, I made a hone with a plank about nine feet long, and two poles, pretty much the shape as those we smooth our roads with; and if it is not heavy enough lay a post or two on it. It ought to be so constructed as to draw the loose earth towards the furrows. In the spring, about the time clover seed is sown, sow about twenty pounds of lucerne seed to the acre, and harrow it in with a sharp, heavy iron-toothed harrow twice over, once each way, and roll it with a light roller, across the ridges, to be drawn by one horse. After the grain is taken off, let it remain in that state (not pastured) until spring. Soon after the frost is out of the ground, before it is much settled, harrow it once each way with the heavy harrow. I had mine pointed with steel. The harrow ought to be made in two parts and hung together with hooks and eyes; then it can readily be lifted up on one side by the driver, and cleared by a boy to accompany him with a rake. It may be harrowed three or four times over after every mowing, remembering to pick up the loose stones. The reason I recommended laying it in ridges is, because it can be more readily smoothed with the hone. If it is not smoothed, the harrow will not have the desired effect; and the natural grasses are apt to get in. I generally let mine stand until in blossom, when it is designed for hay. I usually get three good crops, and think the hay is better for all kinds of stock than any I have ever seen. My first crop has sometimes been so large, that it is best to cut it rather earlier, as it will sometimes lodge and may injure the roots.

As this grass requires more time to cure than some others, I thought it might be well to inform thee how I manage it. That which is cut in the forenoon, if the sun shines, may be turned with a rake towards evening, but not opened; and that which is cut in the afternoon may remain until the next afternoon, before turning it. That which was first turned ought to be turned the next forenoon, and put in cocks early in the afternoon, and let it remain two nights in cocks; then open it and lay the forks/ls separate, shaking it well, and if it does not appear to be sufficiently cured after being turned, put it up in cocks and let it remain one night more. When the hay is housed, I generally put half a bushel of salt to a load—say to about fifteen hundred.

As this grass, especially the first crop, is apt to be very large, it is liable to be injured by heavy rain when in cock. I would therefore recommend to those who raise it, to get a quantity of low-priced yard-wide linen cloth, and give it a thin covering with boiled tar, with a painter's brush, on both sides, and sift some fine sand on it while warm; and when dry, cut it in squares and fasten a small stone to each corner to prevent their blowing off the cocks. These cloths cost but little, and with care will last many years, and may be very useful for other kinds of hay; for want of them, one of my neighbors had a large quantity of clover hay much injured.

When the swaths are turned the second time, let two be turned towards each other, then when it is raked, the horse can walk between them, and let a boy keep by the side of the horse, and when the rake is full, let him open the swaths with a fork, that the rake may readily enter.

I have been thus particular, being desirous that whoever may wish to raise this grass, may succeed, as a number of my friends have been disappointed for want of proper management.

Thy assured friend, JAMES BYRD.

P. S. If the seed is sown on winter wheat in the spring, it ought to be done when the ground is neither too wet nor too dry, but when it will crumble.

Flushing, 2d mo., 19th, 1840.

For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

The only indication of a favorable change in commercial affairs is the improved state of domestic exchanges, which, in the Atlantic states, with a few exceptions, do not exceed five per cent.: thus indicating a tendency to the resumption of specie payments. But it is remarkable that, with the largest crops ever produced in the west and southwest, the rate of exchange against New Orleans and Mobile has increased within the last two months.

The receipts of cotton, in all ports, reach nearly to 2,150,000 bales, against 1,315,000 to 1st July, 1839. The price has undergone little variation for some weeks; 6 to 9 cents embracing most sales, and 5 to 10 the extremes. Foreign markets have of course been influenced by the certainty of receiving larger supplies than can possibly be wanted by the manufacturers until another crop shall mature. On the prospects of this growing crop speculators must base their operations. As yet, the only disaster it has suffered, has been from the inundations of the rivers in all the cotton growing states.

The British manufacturers complain that there is no demand for goods for the supply of this country, and that one of their most important resources is thus cut off.

The export of flour and grain to England,

which has been very extensive, will result unprofitably to the shippers; as, after the cry of deficiency and apprehended starvation, the prospect of a very good and very early crop this year has allayed all apprehension. Flour in Liverpool is worth but about 24 shillings sterling per barrel; being lower than in Havre and other French ports. The crop of wheat produced in the United States last year far exceeds that of any previous one. The supply from the states bordering on the lakes and the Ohio, seems to be inexhaustible.

The harvest in Virginia is now far advanced; and although not a very abundant, is considered a very good one. The weather has generally been favorable hitherto, and the quality of the grain is good. No price is yet established; but it cannot be high, when flour sells at \$4½ per barrel. Corn is worth 50 cents per bushel.

The crop of tobacco is also most abundant: that of Virginia is estimated to be 50,000 hhds., of Kentucky nearly the same, and of Maryland and Ohio, about 34,000 hhds. With so heavy a supply, prices are well sustained; the general sales at the inspections being from \$3½ to \$11 per hundred. The small stocks held in Europe induce shippers to pay these prices.

Stocks are generally low, particularly those of banks, railroads, and manufacturing companies, whose operations are all injuriously affected by the deranged state of commerce and the currency.

To give an idea of the receipts of produce at New Orleans, those of the prominent articles, from October 1st to June 15th, are annexed:

Cotton, - - - -	902,000 bales.
Tobacco, - - - -	38,000 hhds.
Sugar, - - - -	37,500 hhds.
Flour, - - - -	450,000 barrels.
Whisky, - - - -	45,000 barrels.
Lead, - - - -	220,000 pigs.
Bacon and pork, about -	33,500,000 pounds,
(including 4,700 hhds., 118,000 bbls., and 6,200, -	000 pounds in bulk,) besides many other commodities to a large amount.

X.

June 24, 1840.

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* * The communication on the "Analogy of the generation and reproduction of plants and animals," and "Remarks on the vegetable kingdom, soils, &c." will appear in No. 7.

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JULY 31, 1840.

No. 7.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ANALOGY OF THE GENERATION AND REPRODUCTION OF PLANTS AND ANIMALS.

To the Editor of the Farmers' Register.

I send you the following facts. The first eight numbers are from Mr. Geoffroy, and all the others are collected from Malpighius. Some of the numbers I consider valuable, viz.: the 11th, 12th, 14th, 15th, 21st, 25th, and 26th. Geoffroy's 2d, 3d, and 7th numbers deserve notice. If you think they are worth a place in your valuable periodical you will publish them. WILLIAM B. SMITH.

Nos.

- 1st. Flowers contain the male and female organs of generation of plants.
- 2d. The male organs are small bladders, (the apices,) full of a very fine dust; each particle of which is of a particular distinguished form in each species of plants.
- 3d. When this dust or farina is sufficiently ripe, the bladders break with an elastic force, and throw the dust from them.
- 4th. The female organ is the *stylus, pistillum*, or *tuba*, consisting of several canals, which are open and wide at one extremity; but in the other, nearest to the stalk of the plant, terminate in one or more cavities, where small roundish *ovula* are contained.
- 5th. Both organs of generation are contained within, and protected by, leaves of different make and color in different plants; which leaves are generally called the *petala* or flowers.
- 6th. Some flowers contain both the male and female organs, and therefore are called hermaphrodites; others only contain one or the other kind, and thence are named male or female.
- 7th. Those flowers which are only male or only female, either grow both from the same root, or the male only grow on one plant and the female upon another of the same species; from which such plants are said to be male or female.
- 8th. When the male farina, or dust, is prevented from having access to the female organs, either the *ovula* do not increase into seeds, or if they do grow, they are deformed, do not contain any germ or rudiment of the young plant, and are not prolific.
- 9th. When the fecundated *ovula* increase, the germ, or young plant of each, is seen lodged in a pulpy substance named the *seminal leaves*; which again adhere to, and frequently are sunk some way into a depression of a membrane, which forms a little bag for containing a liquor; and therefore this bag is called the *amnios*.
- 10th. From this side of the *amnios*, opposite to that where the germ, with its *seminal leaves*, is fixed, a tube (the *umbilicus*) goes out to be continued to the *uterus*.
- 11th. Before the umbilicus reaches the uterus, it passes through a cavity formed by another membrane that is full of liquor, or contains a great number of small vessels distended with liquor; and therefore is compared to the *chorion*.
- 12th. The chorion and amnios become more and

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more turgid with liquors for some time; but then the liquors begin to diminish, the chorion being soonest emptied, and the navel string shrivels away till it can no longer be observed.

- 13th. In the mean time the germ and seminal leaves increase apace.
- 14th. At last all the liquors in the chorion and amnios are consumed; their membranes contract and shrivel; the seed is sufficiently large and confirmed; the small peduncle, by which it adheres to the uterus, shrivels, turns hard and brittle, and the seed fall off with the least force.
- 15th. The seed is composed of its membranes or teguments, of a large farinaceous part, and of the small germ joined to the farinaceous substance by a small peduncle, which is inserted into the germ, between the *caulis*, stalk, or plume, and the radicle, or small root, of this young plant.
- 16th. The germ is evidently the young plant, where the plume and root may plainly be seen.
- 17th. When the fecundated seed is sown at the proper season, the farinaceous substance soon becomes softer, and the germ stretches its stalk upwards and its roots downwards.
- 18th. The farinaceous substance either remains under ground, turning larger for some time, but having its substance changed more and more into a milky liquor, or it is extended upwards in form of one or two pulpy juicy leaves. From the different forms which this farinaceous substance takes, it is called the *cotyledons, seminal leaves* or *lobes*.
- 19th. After some time, the lobes begin to shrivel, and to have their liquors consumed; and at last, when their juices are all wasted, they fade away and fall off.
- 20th. The plant grows very fast all this time.
- 21st. When the cotyledons are taken off before the plants are put into the earth, scarce any of them will vegetate, and all perish very soon.
- 22d. Those that advance any, after being thus deprived of their cotyledons, increase rather in their plume than root.
- 23d. When the seminal leaves are taken away, after allowing the plant to vegetate so far as to come above ground, it perishes in a little time, the roots generally fading first.
- 24th. If the cotyledons are taken away later, most of the plants die, and those that continue to grow are always very small.
- 25th. When only one cotyledon is taken away, the plants do grow, but are not near so large or strong as the others that are left entire.
- 26th. By taking away the plume, when it first sprouts above ground, the roots grow very large and quickly.

Remarks by Alexander Monroe, Sen., M. D., on the preceding 26 numbers.

"To fix an analogy here between animals and plants, it will be necessary to determine how long either of them should be said to remain in the state of a *fatus*; which, in my opinion, ought to

be understood so long as the young creature is nourished solely by liquors furnished by the uterus of the parent; but as soon as it is supplied any other way with all or any part of its nourishment, it can no longer be looked on as a *fœtus*.

"If this is agreed on to be the distinguishing character of a *fœtus*, it will be evident, that we are to regard plants as *fœtuses* while the seed is ripening, and before the earth, water, moisture of the air, &c., have been communicated immediately any matter for its increase: and, in this case, it will appear most probable, that the umbilicus pours in liquors from the uterus and chorion into the amnios, from which it is taken up by the vessels of the seminal leaves, to be conveyed partly into the *fœtus*, and partly into the leaves themselves; by which the plant is increased, and its parts are explicated, and a substance is provided for nourishing it afterwards, when its tender roots either can receive from the earth very little, or any thing less than is necessary for the sufficient growth of the plant.

"In running this analogy between animals and plants, you will observe the mixture of the mechanism of the viviparous and oviparous animals in the nourishment of the *fœtuses* of plants. For the little plant having, as in the viviparous animals, a communication with the uterus of the parent till it is fully formed, the whole quantity of the liquor it is to be nourished with is not at first to be seen, as the albumen is in the egg; but the uterus furnishes the liquor to be gradually absorbed by the cotyledons or *placenta*: and then, on the other hand, plants resemble the oviparous animals, in so far as the parent being incapable of supplying any juices prepared in its own body, after the *fœtus* is separated from the womb, for the nourishment of the plant; and the young plant not being in condition, for some time, to subsist entirely on the new nourishment it must receive, the farinaceous cotyledons, or pulpy seminal leaves, do the same good office to the plant, as the *vitellus* does to the chick after it is hatched.

"Since the resemblance is so great between animals and plants, it would be superfluous, after what has been said of the former, to enter into a particular detail of the reasons of the foregoing phenomena of plants; and it is almost needless to say, that I would conclude both the oviparous animals and plants to favor my opinion of the whole nourishment of all *fœtuses* being conveyed by particular absorbent vessels, and not by the ordinary canals through which the aliment must pass after the creature is out of its *fœtus* state; for these are obvious to any who reads with the least attention."

EXTRACTS FROM WILLIAM B. SMITHS "REMARKS ON THE VEGETABLE KINGDOM, SOILS, &c."

Delivered before the Cumberland Agricultural Society, April 10th, 1840. Continued from Vol. VII., page 385, Farmers' Register.

Communicated for the Register by order of the Society.

Diseases of plants—curative indications, &c.—Plants and animals, being governed by similar

laws, are in all probability subject to similar diseases; this, I suspect, will be admitted by every individual who has paid attention to vegetable and animal pathology. When the plague of 1666 visited London, not only man and all inferior animals were subject to disease, but the vegetable kingdom suffered in like manner, and gardens, fields and forests were destroyed by the devouring distemper. We have abundant proof, both from history and tradition, that the plagues of every age destroy both kingdoms; and we all know, that our summer and autumnal epidemics are destructive to plants as well as animals.

Doctor Benjamin Smith Barton, who was a distinguished botanist of Philadelphia, inoculated an onion with the matter of small pox, and in sixteen days, (says the doctor,) the onion became eruptive, no doubt the effect of the virus. Plants of all kinds are subject to blights, a most formidable and alarming disease; sometimes a whole plant or tree will perish, now and then a few leaves and flowers only, or perhaps a branch or two will be shrivelled by it, and the rest remain green and flourishing. English writers on gardening suppose blights are produced from cold easterly winds, which are most frequent in England about the latter end of March, or beginning of April. Late writers, who have given attention to this subject, are of opinion that the disease called *blight* originates from insects wounding the tender bark, leaves, &c., in order to drink their fill of sap and other juices.

I suspect every species of plants, their trunks, branches, leaves and fruit, are loaded, throughout the summer and autumnal months, with insects producing disease by the numberless wounds they inflict. It is, then, not at all surprising that plants coated with insects and eggs, during the whole period of their growth, should so often dwindle and die; the astonishment is that they should arrive at any degree of perfection.

In order to remove blights, the curative indications are such as physicians resort to in removing cutaneous or herpetic diseases from the surface of animals, or worms from the alimentary canal. In orchards and forests the trunks of trees should be bored or perforated carefully, and calomel introduced, care being taken not to wound the pith. This will destroy insects on the tender twigs, leaves, flowers and fruit; insects that pierce the bark may be destroyed with lime water, or sulphur and hog's lard, externally applied. The best application, however, is a solution of corrosive sublimate, say 20 or 25 grains to the pint of water: wash the trunks of trees with this solution once a week, or oftener if necessary. Such applications cannot be resorted to in small tender plants, but we may destroy the eggs deposited by insects in the seed before they are sown. To do this, immerse the seed in a solution of corrosive sublimate for twelve hours; 20 grains to the quart of water will be sufficiently strong.

The following compound will destroy the eggs of insects deposited in grain, and prevent smut. Saturate a sufficient quantity of water with table salt; steep grain in this solution 24 hours, and lime it before it is sown.

Some plants are distended with sap, and require bleeding, like man and other animals laboring under inflammatory action. A cure may generally be effected by establishing a drain in the trunk, or by

making a circular incision in the bark of the limbs, called by gardeners, "ringing." In correcting the overgrowth and plethoric habit of fruit trees, I would suggest the propriety of propagating another tree upon them, as for instance the mistletoe. This plant is neither propagated in the earth or water, but upon trees and plants only. The ancients considered it a super-plant peculiar to the oak, but it will grow on many kinds of trees. About the first of January, when the seeds are ripe, they may be made to stick upon the bark of the apple, pear, plum, peach, &c. The viscid juice which surrounds the seed will bind it fast, and I suspect it would be useful in correcting the too great vigor of fruit trees, and cause them to bear, by taking off the superfluous juices or superabundant fluids which are destructive to prolificacy in plants as well as animals.

The "rust" is a disease found among many plants thinly sown in moist rich earth. This disease is produced by an over portion of sap and other watery fluids, which distend and burst the tender ends of the vessels; and the fluids so extravasated become indurated or encrusted on the stem or stalk, having the appearance of iron rust.

From what has been said on vegetable pathology, it is probable plants are subject to many diseases which belong to man and other animals, viz., pyrexia or febrile diseases, intermitting, remitting, continued and inflammatory fevers, erysipelas, pestis, hæmorrhage, and many diseases of the cachectic and locales classes; all of which are to be treated upon general medical principles.

As I am ignorant of the great variety of diseases to which plants are liable, I cannot in the present place extend my observations any further.

Agriculture not reduced to a science, the necessity of reading, &c.—I cannot conclude this vegetable outline, imperfect as it is, without connecting it with agriculture; for the vegetable kingdom would not probably have found a place among the catalogue of the sciences, but for husbandry.

"And the Lord God took the man, and put him into the garden of Eden, to dress it, and to keep it." (Gen. chap. ii., 15th verse.)

"And Abel was a keeper of the sheep, but Cain was a tiller of the ground." (Gen., chap. iv., 2d verse.)

It would seem, from the above quotations, that agriculture had its origin at a very early period, and yet it is not reduced to a science! Man has been busily engaged in tilling the earth for the last six thousand years, his thirst for knowledge has been great, he has had the experience of all who lived before him; and still has much to learn. Indeed, he has been taught but one lesson through life, viz., "Paul may plant and Apollos water, but the increase comes from God." He alone can give the necessary agents in order to produce the evolution and growth of plants.

Those who wish to become skilled in medicine, law, or theology, must pursue a course of hard study for many years; but this period will not give us a knowledge of agriculture; for it requires unceasing and unwearied attention through life; hence the necessity of agricultural reading. A few hours' daily study, will make us good lawyers, priests, physicians, mechanics, statesmen and farmers, and without daily reading, our republican institutions, both civil and religious, will be over-

thrown, and we shall find ourselves surrounded with poverty and ignorance.

The soil and subsoil.—The soil is, properly speaking, nothing more than the surface of the earth in which plants grow; it is of various depths, having a dark color from the decomposition of vegetable and animal matters. This decomposed organic mass is generally called soil or mould, which distinguishes it from the subsoil. Soils vary very much in fertility and texture, and are called rich or poor, stiff or light, &c. The fertility of soils is known by a greater or less proportion of mould which enters into their composition. Forest soils, or virgin soils, are for the most part unmixed with earthy matters, and more or less peaty; on the other hand, cultivated soils are blended with earths. Fertile soils are called loams, as light loams, peat loams, dry loams, wet loams, &c.

Subsoils are distinguished from soils by the absence of mould, they are divided into two classes, viz., earthy and rocky, as clay subsoils, lime subsoils, sand subsoils, rocky subsoils, and so on. Rocky and earthy subsoils are either retentive or porous; retentive subsoils are close and impervious to water, formed of stone or clay. Porous subsoils are loose and open in their texture and water readily filters through.

Shallow soils on retentive subsoils are easily inundated with rains, or become arid from drought. Such soils on porous subsoils drain off water too freely, and become easily exhausted by heat. Deep soils then, on either retentive or porous subsoils, are to be preferred, and the best subsoils are those which are neither too retentive or too porous; a medium between the two is desirable.

Favorable and unfavorable indications of soils and subsoils.—The depth of the soil and texture of the subsoil claim the attention of the agriculturist. A soil from 6 to 12 inches deep, resting upon a limestone subsoil, is one of the best indications. Such soils are found in valley of Virginia, and some of the western states.

In eastern Virginia, the medium depth of soil does not exceed six inches, the subsoil clay and silicious sand; these soils are very good and susceptible of a high state of improvement; but, to the geologist, the indications are unfavorable; for the greater the depth of soil, the more favorable the indication.

Shallow soils, on silicious subsoils, are not to be relied on, and such indications are considered unproductive.

Shallow soils, resting on a feldspar subsoil, produce well and can never become exhausted; for the lime contained in the feldspar supports and feeds the soil. Hence it is that gray soils are, when worn, easily reclaimed; for they generally rest on sandstone or feldspar foundations. Soils resting on white clay, or pipe clay, are unproductive. White earths, white plants, and white animals, are distinctive marks of weakness. Age, which is the parent of weakness, gives a white color not only to the earth, by bleaching and destroying all extraneous matters, but robs the vegetable kingdom of its characteristic green, and gives to the animal kingdom a white skin with white hairs.

Rains that run off with the soil, leaving exposed to the rays of the sun the subsoil, must be considered an unfavorable indication.

Rains that are absorbed and sink in the soil, forming reservoirs of water on the subsoil, may be considered one of the most favorable indications.

A gray soil, presenting on its surface white quartz, mica and sandstone, is thin and weak, having little or no subsoil: this is an unfavorable indication. Gray soils, with pale yellow subsoils, generally grow acid plants, as young pines and sorrels: this is an unfavorable indication.

Soils that produce marine and sub-aquatic plants are generally sterile until the earth becomes drained and pulverized by freezing; then they become the richest and most productive lands. Soils of a dark yellow color, with a deep red clay subsoil, are considered superior soils.

Alluvial soils, when they are of a dark color, are valuable. Oats, barley, rye and corn, flourish and grow kindly in this soil.

From a number of experiments made by Mr. Tillet, he has proved that the best proportions of a fertile earth for corn are

Three-eighths of clay,

Two-eighths of sand, and

Three-eighths of the fragments of hard stone.

Wheat delights in a yellow stiff soil, having clay and lime subsoils.

Tobacco of the finest fibre, and most delicate texture and flavor, is grown on gray soils, having a pale yellow subsoil of sand, clay and gravel. Whereas the coarse, large, rich, dark tobaccos, are found growing on fertile yellow soils resting on a subsoil of red clay. Clover, herds-grass and timothy arrive at great perfection in such soils, more particularly if they are moist.*

Indications from the growth, &c.—A soil must be good, when it puts up luxuriant growth, either in the field or forest; the stems of plants and trunks of trees straight and tall, having many plants and trees of distinct species.

We find on the richest soils in the United States, viz., in the Mississippi valley and its tributary streams, the buck-eye, cherry, ash and sugar maple; with an undergrowth of vines, May apple, puccoon and Indian turnip. Such trees and plants are considered the best test of rich loams in the west.

The next soil, in fertility, grows walnut, mulberry and red bud, with a thick undergrowth of paw-paw, spice wood, &c.

Third. Poplar, locust and sycamore, with an undergrowth of hazle-nut.

Fourth. Hickory, oak and pine, with an undergrowth of rich weed and angelica. This soil, after cultivation, grows dock, poke, Jamestown weed, and wire grass, all of which are considered indications of rich earth. This was the native growth of the highlands of Virginia, and her soil originally was perhaps the best in the United States.

Fifth. Oak lands interspersed with heart pine,

* Chaptal says, "a proper soil is that, 1st. Which affords a sufficiently firm support to prevent the plant from being shaken. 2d. Which permits the roots to extend themselves to a distance with ease. 3d. Which becomes impregnated with humidity, and retains the water sufficiently, that the plant may not be without it when wanted. To answer these several indications, it is necessary to make a proper mixture of the primitive earths, for none of them, in particular, possesses them." See Elements of Chemistry, by M. J. A. Chaptal, page 451.

having an undergrowth of whortleberry, should be rejected, the soil is silicious and thin, requiring a constant-accession of water and manure.

Sixth. Red-oak lands are not rich, but have generally a clay foundation, and produce wheat kindly.

Seventh. White-oak lands interspersed with gum are not to be relied on; they are, however, valuable on account of timber and the quantity of food they afford for hogs.

Eighth. Post-oak lands, with an undergrowth of haw, produce fine crops, but when worn they are hard to reclaim.

Ninth. Chestnut-oak lands are considered sterile.

Tenth. If we are to judge of the soil from its growth, the most unfavorable indication is dwarf black-jacks, with dead limbs covered with moss, interspersed with chinquepin bushes and occasionally lightwood knots and stumps of pine. Such lands, when cleared and cultivated, put up poverty grass, sassafras bushes and blackberry vines.

Eleventh. Prairie lands are fertile and valuable in proportion to the depth of soil; the best and deepest prairie soils are without forest trees, the soil being light, causes the growth to be shaken by winds and prostrated in storms. Or it may be owing to the circumstance that such soils are peaty from luxuriant coats of vegetation, and are unfavorable to the growth of forest trees. Various opinions have been given us by geologists on the subject of prairies; the most plausible is that those extended fields were originally lakes or seas, in which vegetable matters were partially decomposed, and a rich mould left after the waters receded: but they have never given a satisfactory reason why such lands are not clothed with the growth of the forest. Prairie lands are very fertile, growing sward, and thickly covered with many species of plants. Generally speaking, all the rich and more nutritious pasture grasses are to be found on prairie lands.

ON THE DEANSTON FREQUENT DRAIN SYSTEM.

As distinguished from and compared with the furrow draining and deep ploughing of the Midland counties of England. In a letter to the Editor. By the Right Honorable Sir James Graham, Bart., M. P., F. R. S., &c. Read Feb. 20, 1839.

From the Franklin Farmer.

A recent inquiry addressed to me by the Lord Spencer, relative to the "Deanston frequent drain system," induces me to believe that I may render some service to agriculture, if I am so fortunate as to direct the attention of your readers to this important subject at this particular time.

The great object of our quarterly publication is, as I conceive, the establishment of an authentic record of practical experiments; and by multiplying facts and proofs of this description agriculture will be treated as a science, and will advance, and the transactions of our society will become the depository of useful information, verified by the name and the address of the several correspondents.

Mr. Smith, of Deanston, in the county of Perth, was examined as a witness before the agricultural

committee in 1836. He gave a detailed account of his system of draining, which very much resembled the furrow draining of the midland counties of England, except that at Deanston, stone being on the ground, the drains are made with stones and not tiles; and at Deanston the cover of the drain is 22 inches below the surface; whereas, in Leicestershire and Northamptonshire the top of the tile in the furrow is not so deeply laid. Mr. Smith, when his land is effectually drained, lays it down without a furrow; in the midland counties the furrow is carefully preserved.

Mr. Smith, after draining, for the first rotation at least, does not bring to the surface any of the sub-soil: but by a plough of his own invention, which follows a common plough turning up the surface he penetrates the subsoil to the depth of 20 inches, and breaks and pulverizes the lower crust without bringing it to the top. This subsoil plough, such as Mr. Smith has used, is a heavy implement, requiring the draught of four, six or eight horses, according to the tenacity and strength of the substratum.

Mr. Smith contends that the sub-soil, by being moved, becomes pervious both to air and moisture; and the efficacy of the drains are thus perfected and perpetuated, and that the character of the sub-soil itself, when relieved from superfluous moisture, and open to atmospheric influences, is entirely changed, that it becomes mellow and friable, and after one rotation, or a lapse of five years, that it may be brought to the top, by deep ploughing, with safety and propriety, and be mixed with the surface-soil to great advantage.

In the midland counties of England, deep ploughing after furrow draining has been the constant practice; but the use of six horses in a sub-soil plough is a novelty in Scotland. In England a portion of the sub-soil is raised at once to the top: at Deanston the sub-soil, though broken, is not so raised, and here the important question arises.—

When land is effectually drained, which is the right treatment of the sub-soil? Will you bring a portion of it immediately to the surface by deep ploughing, or will you, with Mr. Smith, delay this operation for some years, until the sub-soil shall have been mellowed, after having been broken and penetrated by the atmosphere?

The advantages of the wide circulation of agricultural knowledge, of the multiplication of the experiments, and of the interchange both of the theory and practice between Scotland and England, will here develop themselves in the clearest light. Furrow-draining and deep ploughing have been practised in England for half a century; yet the introduction of an analogous system into Scotland is regarded almost as a discovery. But in Scotland itself the greatest difference of opinion prevails on the question of turning up or only moving the sub-soil after draining. Some of the greatest authorities in East Lothian differ from Mr. Smith, and lean to the English practice. In the first furrow for green crop after draining, by two ploughs following each other, which is equivalent to trench-ploughing, they go down to the depth of 12 or 14 inches, and bring a certain quantity of virgin soil.

It is obvious that this difference of practice in the treatment of the sub-soil involves a most important question, which can only be solved by accurate and multiplied experiments. The outlay of

capital, which is common to both plans, consists in effectual under draining, and no subsequent management, no fresh application of capital, can be of any avail, unless, on retentive soils or a substratum of clay, the water be quickly carried off. This I take to be an axiom undisputed in agriculture; but after effectual draining, when this outlay has been incurred, the mode of treating the sub-soil affects only production, and does not involve expenditure; and greater produce without additional outlay is the grand object of the practical farmer.

We have seen that in draining Mr. Smith uses stones, because he has them on the spot. Tiles are substituted in the midland counties of England, because stones cannot be obtained easily, and because in the clay districts tiles are cheaply and easily manufactured.

It has always appeared to me that skill in agriculture does not so much consist in the discovery of principles of universal application as in the adaptation of acknowledged principles to local circumstances.

The peculiarities of soil and climate, what nature gives or nature withholds in each particular district, must be carefully considered and judiciously investigated, before any given experiment, though locally successful, can be pronounced to be generally useful or universally applicable. The neglect of this consideration has brought agricultural experiments into disrepute, on account of the heavy losses which they have occasioned. If the record now opened in these transactions be faithfully kept, this evil will be averted; for I hope that each experiment detailed will be authenticated by the name of the party who makes it, and that every local circumstance of a peculiar character will be carefully particularized.

My attention having been thus directed to the various treatment of sub-soils after under draining. I tried an experiment, in the year 1838, on a field of about eight acres of the poorest and wettest land. The surface soil is about five inches deep, of black earth of peaty quality: the sub-soil is a weeping retentive clay with sand and rusty gravel intermixed. This clay goes down to the bottom of the drains, which are of tile, laid 30 inches deep, in every furrow.* This field is in a farm lately taken into my own hands, and was rented by the outgoing tenant at 4s. 6d. an acre. It was in pasture of the coarsest description, overrun with rushes and other aquatic plants.

After draining, on one-half of this field, I used Mr. Smith's sub-soil plough, on the other half I trench-ploughed to the depth of 10 inches by two ploughs following in succession: in the first part not mixed with the surface any of the sub-soil, in the last part commingling the surface and sub-soil in nearly equal proportions. The whole field was heavily but equally manured and planted with potatoes; and though the potato crop even on good land, in this neighborhood, was below an average, yet the crop in this field exceeded an average, and yielded about 12 tons per acre. The field is equally drained in every year. I filled up the tile-drains with porous materials, such as stones, moor-turf reversed, and tops of thinnings of young

* The size of the tiles used was 6 inches for the main drains, and 3 inches for the common drains. The tile drains were laid 10 yards apart.

plantations, to the exclusion of the retentive clay which held the water. The crop of potatoes was so equal throughout the field that I am unable to pronounce positively which part was the best; but I am inclined to give the preference to that portion where Mr. Smith's sub-soil plough was used. Since the potatoes were taken up the land has not been ploughed or ridged up, but remains perfectly flat; and I observe, where Mr. Smith's sub-soil plough was used, that no water whatever, notwithstanding the wetness of the season, has stood upon the land; where trench-ploughing was adopted, and a portion of the clay brought to the surface, after heavy falls of rain the water has stood for a time in hollow places; and here the land, in consequence, would seem to be rather soured. The field will be sown out this spring with oats and grass seeds, and I shall watch with anxiety the future effects of the past different treatment.

In the meantime I have relet the farm: the outlay in draining and extra ploughing cost me £6 18s. 4d. an acre;* but the field in question, which was valued at 4s. 6d. an acre to the out-going tenant, is rented by the incoming tenant at 20s. an acre on a lease of 14 years.

On a small field of very retentive clay, of a hungry and bastard kind, intermixed with rusty gravel, I tried six years ago, the experiment of trenching with the spade after close and careful draining; I buried the surface soil, which was poor and exhausted; and I brought the sub-soil to the top from the depth of 18 inches. I limed this land and sowed it out with grape and grass seeds. It has been very unproductive ever since, and all my expenditure upon it, hitherto, has been thrown away; for, though dry, it bears no more grass than before the draining. I think, however, that the surface soil is now mellowed by exposure to the atmosphere; and I am about to break up this field and to put it through a rotation, in the confident hope of increased production. I have also ordered a field of 20 acres, of dry and good land, cropped out by a bad tenant, to be treated with a view to this experiment on sub-soil. The field lies in two ridges on the bank of the river Esk: the soil is alluvial deposit: on the lower ridge next to the river the surface is a fine loam 12 inches deep, incumbent on a sub-soil of sandy loam 16 inches deep. On the upper ridge the loam does not exceed 8 inches, but the subsoil is a good clay 13 inches deep: in the hands of tenants up to the present time, the depth of the furrow ploughed has never exceeded 6 inches. I have ordered the lower flat to be trench ploughed to the depth of 14 inches, bringing the virgin loam to the top; I have ordered the upper flat to be stirred with Mr. Smith's sub-soil plough, thus breaking the lower crust, without changing the surface. The whole

	£.	s.	p.
* 70 rods of draining, cutting, laying the tiles, and uplifting, at 4d. per rod,	1	3	4
1500 tiles per acre, at 30s. per thousand,	2	5	0
Carriage of do. 6s. do.	0	9	0
Do. of turf, &c. for covering the tiles, 70 rods, and cutting do. at 6d. per rod, gives per acre,	1	15	0
	5	12	4
Ploughing with the Deanston plough, with four horses,	1	6	0
Cost per acre,	6	18	4

is to be manured equally with bone dust, and a crop of turnips is to be taken.

I shall be happy, at a future time, to communicate the comparative result of this different treatment, and I trust I may be pardoned for my present intrusion, which arises from my anxiety to fix the attention of the farmer on this question of the treatment of sub-soil, which, by judicious management, I think may add to the power of production without cost; especially when the surface, by long and repeated cropping, has been exhausted and has become comparatively sterile. At the commencement of our publication I could not omit an opportunity of endeavoring to use it for the legitimate purpose of inviting accurate experiment, with the view of circulating the extending agricultural knowledge.

I have the honor to be,

Sir, your faithful servant,

J. R. G. GRAHAM.

SCALDING SEEDS BEFORE PLANTING.

From the New Genesee Farmer.

Great losses are often sustained by neglecting to scald seeds, before planting, for some entirely fail to grow, and others remain a long time in the ground, dormant, when they ought to be up and growing. About a fortnight ago, we planted some seeds of the cypress vine, and being in haste, we could not take time to scald them—they ought to have remained untouched. A week after we got time to scald some; and these are now up, but the former have not yet appeared.

But we write for farmers as well as gardeners.—Four days ago, we scalded some seeds of the sugar beet, and let them remain in the water. This morning we planted them, and many of them were sprouted. Last year we planted mangel wurtzel without scalding; but we shall not do so again: in the wettest ground, they germinated freely; but in the driest and richest part, they stood far asunder—not half a crop.

We are not aware that any seeds are injured by scalding, though there may be many; and we should be gratified to have extensive experiments instituted on this subject. Some seeds would probably bear more heat than others—we know that some are more benefited than others. The duration of the heat applied will be regulated in some measure by the quantity of water, and the kind of vessel into which it is poured, some cooling much sooner than others. Several quarts of Indian corn may be safely scalded at once.—Other seeds may not need more than a tea-cupful of water; but let it be fuming hot. Remember, however, there is a wide difference between scalding and boiling; and after the water is applied the vessel should be set away from the fire. On seeds untried, it would be prudent to use but little water.

Some years ago, we planted seeds of *cercis canadensis*. Part were scalded and part planted without that preparation. A difference in the germination of perhaps twenty to one, was the consequence—very few of the unscalded seeds growing.

One week in the advancement of a crop of corn or pumpkins is frequently of great account; and

the farmer may be prevented from planting at the right time by accidents, or bad weather. In such cases, let them try this remedy.

AGRICULTURE OF FRANCE.

(Concluded from page 331.)

The wood of France may be divided into six classes: 1. For ship-building. 2. For the use of house carpenters. 3. For the construction of carriages. 4. For joinery. 5. For vine props. 6. For fuel. Oak is chiefly used for the first class; for the second, oak, fir, linden, and aspen trees; for the third, ash, oak, maple, and especially elm; for the fourth, fir, beech, elm, pear tree, apple, cherry tree, cornil tree, aspen, poplar, linden, &c.; for the fifth, osiers, and branches of different trees; that destined for fuel is divided into new and old, and is distinguished by the names, *bois perdu*, *bois cernard*, and *bois entrain*. The cork-tree flourishes on the French side of the Pyrenees, and produces very fine cork-wood.

Under the old government, the national forests embraced 3,000,000 arpents, and gave about 12,000,000 francs to the royal treasury. By the revolution, all the forests formerly held by the corporate bodies and the emigrants were annexed to those of the state, which thus were increased to upwards of 4,000,000 arpents. These, added to the forests in Belgium, and on the left bank of the Rhine, in the year 1806, yielded rather more than 70,000,000 francs, according to the budget for that year. All forests above 300 acres were also added to the national domains, and declared inalienable. In the year 1800 the national forests were thenceforward exempted from the land tax. The revolution did not abolish the arbitrary laws under which the private proprietors of woodlands labored. According to these laws, the government appointed persons, who were proper judges of ship timber, to examine all the woods, and to mark such trees as they deemed fit for their purpose, after which the proprietor durst not lay the axe to the roots of them. Besides, no individual proprietor of woodland could cut down his timber, or clear his land, under a heavy penalty, without making, six months previously, a declaration of his intention to one of the conservators, whose report determines the government either to grant or refuse permission to that effect.

To this general account of the woods in France, we shall add some short notices of such trees as are sources of national wealth, independently of the timber which they afford, as an appropriate introduction to our account of the vine husbandry, and the wines of France.

The fine turpentine tree is found in the southern parts of France, as well as in the Isle of Chio, and in the Indies: the juice is the Chio, or Cyprus turpentine of the shops. Considerable quantities of turpentine are also made in the vicinity of Strasburg, from the silver fir; it is known by the name of Strasburg turpentine.

Beech oil, drawn by expression from the *mast* of the beech tree, after it has been shelled and pounded, is very common in some parts of France, especially in the department of the Aisne, and is used instead of butter. After the oil has been ex-

tracted from the *mast*, the *marc*, as it is called, is also used for food, in various ways; sometimes simply as the extraction leaves it, in which state it is also given to poultry, pigs, oxen and cows; or as flour, being ground in a flour mill and houlled; or as a kind of cheese, (*fromage*), in which case, as it comes from the press, it is moistened with milk, and put into moulds. In Burgundy and Franche Comté, the *marc* of walnuts is made into this kind of *fromage*, after the oil is extracted from it. Walnuts are grown very extensively in France, and a great deal of oil is made from them.

Chestnuts abound in France, particularly in the Limousin, where the land is almost every where covered with chestnut trees. The fruit serves for food to the country people, but not, as has been asserted, reduced into flour to make bread. Their manner of preparing chestnuts for food is as follows: they take off the first peel or rind, when they are dry, then they boil them a little, to take off the second peel; and afterwards they boil them entirely, to reduce them into a kind of pap. Thus prepared, they are said to afford a pleasant and nourishing article of food to the peasantry of the Limousin, and other parts of France.

The caper shrub grows in great perfection in the southern provinces, especially in the vicinity of Cuges, between Aubagne and Toulon, where an extensive valley is wholly devoted to the culture of them. The caper is not suffered to grow here, as it does in many places, into a bush; but is made to creep on the ground in long runners; and being cultivated only for the trade, is never left to flower, it being the little bud of the flower that is used for pickling. The fruit also, which resembles a very small gherkin, is pickled; but these have the name of *cornichons*, the French name for gherkins: it is the flower-bud which has the appellation of capers. When suffered to flower, it is a very beautiful shrub.

The islands of Hieres, not far from Toulon, were formerly famous for their orange groves. In the year 1565, Charles IX. visited these islands in a progress he made through the south of France: he was accompanied by the young king of Navarre, afterwards Henry IV. and the Duke of Anjou; and there was then an orange tree so large, that these three royal personages, taking each other by the hand, could but just encircle the stem: it had produced in one year 14,000 oranges. But the climate even of the south of France, is not steadily warm enough for this fruit; the severe winter of 1789 killed every tree in the Hieres, down to the roots; and the trees at present there are only such as have shot up from their roots. Most of the oranges of Hieres are sent to Paris. In these islands, and in some other parts of the south of France, the lemon, citron, date and pomegranate, are not uncommon, the lime is cultivated, especially in Provence.

The trade of almonds carried on in France is considerable, both on account of their oil, and the large quantity of them used in Lent, either shelled or unshelled: a great quantity of the sweet almonds are used in sugar-plums, and of the bitter ones in biscuits, confectionary, &c. The grocers and druggists of France have both sorts from the provinces in the middle and south of France, especially Provence, Languedoc, Touraine, the county of Venaisin, Avignon, &c. The best

are those of the county of Venaissin; those from Chiron in Touraine are the worst. The environs of Aix are particularly noted of all parts of Provence, for the abundance of almonds they produce: they are an uncertain produce; a frosty night will sometimes come on, while they are in blossom, which is commonly about the end of January, and in a few hours the greatest part of the crop will be destroyed. At the time when the almonds are gathered, it is a curious sight at Aix to see the women sitting at their doors cracking them for the merchants. The shells being an excellent article of fuel, great interest is made to get the almonds to crack, which is paid by having the shells: a certain measure in the shells, is expected to produce a certain measure without them. The person cracking them has a basket of fruit on one side of her, and another basket on the other side to receive them when cracked: she has a flat piece of stone on her knee, and a bone with a knob to it in her hand; and laying the almond on the stone, she strikes it with the bone, which seldom fails to crack it at the first stroke: it is then thrown shell and all into the receiving basket, and when that is full, the almonds are emptied out upon a large table, and the kernels picked from among the shells. The whole process is performed with wonderful dexterity and rapidity.

Figs are another important article among the productions of Provence, as well as of several other districts of the south of France. The most celebrated is a very small green, or white fig, as it is often called, which grows only in the territory of Marseilles, whence it takes its name of the fig of Marseilles. Brignolles in Provence, a town about thirty miles from Marseilles, is one of the most famous places in the kingdom for the dried plums, which are so well known by the name of French plums. Prunes, or St. Catherine's plums, constitute a lucrative branch of traffic, almost exclusively carried on at Tours and Chatelherault. These prunes are gathered at La Haie, Sainte Maurevaux, Maudion, &c. They are prepared with the greatest care at the places where they are grown; and sent to the merchants of Tours and Chatelherault, who supply every other part of France, as well as foreign countries, with them. The grand purchases of this fruit are made at the commencement of the new year, and of Lent: during the latter season, the demand is particularly great at Paris, and in other large cities and towns in France. Dried plums of excellent quality are also prepared at Agen, Cutoen, Toulouse and Bordeaux.

Mulberries succeed best in the olive climate of France; Tours being the only place north of the maize climate, where they are cultivated for silk with any success; the spring frosts being fatal impediments to their culture in the central, and even sometimes in the southern districts of the kingdom. Considerable experiments have been made for introducing them into Normandy, &c. but without success. In proceeding from Paris to the south, they are not met with till we come to Causade near Montauban; there are a few at Auch, and even at Tours; the district in which they are grown is of small extent. Before the time of Henry IV., the mulberry trees had been propagated for silk-worms only in the Lyonnais, Dauphiny, Provence, and Languedoc; but that king carried them as far north as Orleans; he also

planted them near Paris, and attempted to breed silk-worms at the Tuileries, Fontainebleau, and the castle of Madrid, but without success. In the Lyonnais the white mulberry succeeds extremely well, and a great many silk-worms are reared: the worms are kept in houses, and the leaves carried to them. It is a singular spectacle to see whole trees stripped of their leaves, and bearing the appearance of winter when other trees are in full foliage. A second crop of leaves, however, comes out, but not with the beauty and luxuriance of the first; and they are often gathered to give to the sheep and cattle when other food fails. The white mulberry tree bears a more delicate kind of leaf than the black, for which reason they are always given to the silk-worms, as the silk produced from them is of a much finer quality: the fruit is vapid and good for nothing. The leaves are purchased and paid for according to the size of the tree, by those who keep silk-worms, but have not mulberry plantations of their own.

The limits of the olive climate have been already defined: They comprehend a very small portion of the south and south-east of the kingdom. In France, there is a great difference in the quality of the oil produced from them; that of the territory of Aix is reckoned the finest. Here the trees are very small, commonly from about eight to fourteen or fifteen feet in height. About Toulon and Hieres the trees are taller, but the oil is of a less delicate quality. The tree resembles a pollard willow in the general appearance, and is by no means either beautiful or picturesque. The fruit is gathered green for making the oil, but if left to ripen, it becomes almost black. When they are preserved, or pickled, they are salted first for a few days, and then put into jars with oil and vinegar. In most houses in Provence lamps are used in the kitchen instead of candles; and among the lower classes they are used universally. Olive oil is used in them. The wood of the olive tree makes excellent fuel when a brisk fire is wanted; but it partakes so much of the greasy nature of the fruit, that while it burns very bright it also consumes very fast. The time of gathering the olives is soon after the vintage. In the hard winter of 1789, so many olive trees were destroyed by the frost, and during the revolution so few young trees have been planted, that Aix, which was the principal seat of the commerce in oil, has almost entirely lost this, its first and most lucrative branch of trade; and as these trees are many years in coming to perfection, this loss is not likely to be soon compensated.

As there were aides and customs levied on the consumption and export of wine previously to the revolution, it might have been supposed that the quantity of vineyards in the kingdom might have been estimated with a tolerable degree of certainty, yet there is an amazing difference of opinion on this subject. M. de Trone, author of a work on the provincial administration of the taxes, is of opinion, that their extent is 1,600,000 acres. In this calculation, M. Mirabeau coincides; but the author of *Credit National*, who published only one year afterwards, calculates the quantity at 18,000,000 arpents. M. Lavoisier supposes the produce 80,000,000 livres. The economists in the *Encyclopedie*, make the annual produce 500,000,000. This, at an average produce per acre of 175 livres, would give 2,857,142 acres. Mr.

Young, after considering these and other calculations, gives it as his opinion, that the vine is cultivated on an extent, that constitutes nearly the twenty-sixth part of the territory of France, or about 5,000,000 of acres; and that grapes form about one-sixth part of its produce.

The vine is cultivated on all kinds of soil: on the noble and fertile plain of the Garonne; on the richest lands in the vale which extends from Narbonne to Nismes; in the vales of Dauphiny and the Loire; and, in short, on every sort of land in the wine provinces. They are, however, perhaps most generally planted on rocky and inferior soils. The general routine of cultivation is as follows: The vines are planted promiscuously, three or four feet, or two and a half from each other. In the middle of January they give the cutting, *taille*; in March they dig the ground; in April and May they plant the *provins*; in June tie and hoe the *seps*—they are tied to the props with small straw bands—the hoe which is used is crooked; in August hoe again; in October, or if the season has been favorable, in September, the vintage takes place. To plant an arpent of vines costs in all 50 Louis d'or. There are 8000 plants on an acre, 2400 *seps*. The props cost 500 livres; to keep up the stock of props 30 livres annually. It is three years before the vines bear any thing, and six before the wine is good. The amount of labor per acre is about 2*l.*, 12*s.*, 6*d.* The net profit varies from 7 to 10 per cent. Great attention is paid in the choice of the bunches, and in freeing every bunch from each grape that is the least unsound. Sixty women are necessary to gather the grapes for four pieces of wine. Such is the general outline of the culture, &c., of the vine in France. The variations from this mode will be afterwards noticed.

1. The province of Champagne, which is now divided into the departments of the Marne and the Higher Marne, has long been celebrated for its vineyards. In this district there are two kinds of wine; the white wines, called *Riviere de Marne* wines; and the red wines, called *Montagne de Rheims* wines. The white wines are produced from vineyards situated in the valleys, and upon the sides of the hills in Epernay, Dizy, Avenay, Cramant, &c. It is a singular circumstance, that the estate of Cumieres, in the midst of so many vineyards celebrated for white wines, and under the same exposure, produces red wines only. The country producing the fine white wine, is all contained in five leagues length. Among all the vineyards on the Marne, the cantons of Hautvillers, Marcueil, Cumieres, and Epernay, are the most advantageously situated. They extend along the Marne; and it is remarked, that the quality of the wine falls off in proportion as the vineyard is distant from the river. Such exposures on the banks of this river produce excellent white wines. The slope which overhangs Rheims is divided according to the quality of its wines: Of these, the wines of St. Thierry are the most celebrated; but the wine properly called *Clos St. Thierry*, which is produced in the archbishopric of Rheims, is the only wine which unites the rich color and flavor of Burgundy with the sparkling lightness of Champagne. *Clos St. Thierry* holds the same rank among Champagne wines, that *Clos-vougeot* does among those of Burgundy. Sillery wines, once so famous, were in a great measure composed of

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the wines produced in the territories of Verznay, Mailly, and St. Basle. They were made by a particular process by the Marshal D'Estrees, and for this reason were long known by the name of *Vins de la Mareschal*; but at the revolution this estate was divided and sold.

In Champagne, and indeed in all the wine districts of France, the south and the east exposures, and the middle grounds, are preferred. In general, throughout this province, the soils proper for vines rest on beds of chalk: they are planted in November and December; the plants are inserted into turfs, or in *longuettes*. Grafting is not in general use. A good plant will last 50 or 60 years. There is not much variety in the grapes of Champagne; the black are generally preferred to the white. There are whole cantons, however, where there are very few black grapes, and yet their wine is in high estimation. In this province, the vine is pruned about the end of February or beginning of March. It is never allowed to rise higher than a foot and a half. At the end of March, or beginning of April, when the thaws have softened the ground, the hoeing commences. The following is the remainder of the routine practised in the vineyards of Champagne; after the cutting in February or March, and the hoeing in March, as already mentioned. 3. They are pruned in April or May. 4. Tied or propped up in the same months. 5. The next operation is the first trimming for the shoots. 6. Pared and tied in June. 7. Second trimming in July. 8. Third trimming in August. The vintage is in September or October.

Many precautions are necessary in making white wine; steeping before pressing makes red wine, the grapes being allowed to remain in the vessels till the first fermentation has begun in the coloring pellicle of the fruit. In making white wine, great care is taken to keep the grapes from the sun; they are conveyed home in panniers, covered with cloths, from which they are not emptied into the press till after sunset: these precautions are necessary to prevent fermentation. From twenty to forty panniers are put into the press at a time; the contents of two panniers produce half a piece of wine. Forty panniers, yield nine or ten pieces of white wine, and each piece contains 200 bottles. The fruit is pressed by three successive and rapid turns of the screw in some districts, and by two only in others. The whole of the operation should be finished in less than an hour. When the three pressures have been effected, the wine produced from the juice is called *vin d'elite*, or choice wine; after this *vin d'elite* is extracted, the remaining juice is pressed out by another turn of the screw; this is called *premiere taille*, the first cut, and is often added to the *vin d'elite*. Another pressure is given at a subsequent period, and the wine is called *deuxieme taille*, or *vin de tisanne*; lastly, a poorer kind of wine, called *vin de rebuchage*, is produced by repeatedly pressing the husks till they are perfectly dry. The white wines are clarified with isinglass; they are generally bottled in the month of March. About the middle of August, the fermentation in the bottles begins, and frequently there is a loss by the end of September of from five to ten per cent. by the bottles breaking. When the white wines deposit a sediment in the bottles, very minute care is requisite to extract it. The wines of

Champagne, after being put into circulation, preserve their good qualities for ten years; but when they are kept in cellars of their native province, which are superior from the nature of the soil, (being dug out of beds of chalk,) they will continue good for 20 or 30 years.

The price of an acre (100 rods and 22 feet to the acre) of the best vineyard ground in Champagne, varies from 2000 to 6000 livres; the vineyards at Ay selling as high as 6000 livres. The price of an acre of the second quality varies from 1000 to 3000 livres. The ordinary expense of cutting, hoeing, tying and pruning the vines, is 80 livres the acre; of occasionally propping such as have fallen, 60 livres; of props, 16 or 18 bundles, 50 in each bundle, 30 livres; dung and carriage of the vines, 42; five puncheons for the produce of an acre, 50 livres; expense of gathering, pruning, &c., 46 livres; making a total expense per acre of 308 livres. With respect to the produce of an acre of vineyard in Champagne, it is generally understood, that taking the average of 10 vintages, five pieces or puncheons of wine are obtained from every acre; three of these are of the first quality, or choice wines, and two of them are ordinary wines. Valuing the three puncheons of the best wine at 150 livres each, and the two others at 50, the total produce will be 550 livres; from which must be deducted, besides 308 livres for labor, &c., the expense of bottling, cooperage, and fining, 30 livres for the best wines and six for the inferior; the annual interest of the money laid out in the ground, 100 livres; taxes, &c., 72; making in all, with the labor, 516 livres; which being deducted from 550, leaves 34 livres as the net produce of an acre of vineyard in Champagne, on an average of years. This net produce, however, it is very difficult to fix, as the wines of Ay, Haut Villers, Epernay, and Pierry, frequently sell for 300 or 400 livres a piece, while some of the other wines do not bring more than 90 or 100 livres.

It has already been mentioned, that this province is equally famous for its red wines, and some parts of the process by which they are made have been hinted at. To make red wine, the black grapes in general are only picked and gathered. The juice is allowed to ferment, and the degree of fermentation is ascertained to be advantageous, when a lighted candle cannot be held over the tub without going out. When the fermentation has entirely ceased, the puncheon is hermetically sealed. About the end of December, and if possible in dry weather, the wine is drawn off. About the middle of May, it is again drawn off. A puncheon of red wine contains 240 bottles. In general, the red wines of Haute Montagne are bottled in the month of November, i. e., 13 months after the vintage. The wines of St. Thierry can remain three or four years on their lees. The best red wines of Haute Montagne, will keep in bottles in good cellars for six, eight, ten, or twelve years. These cellars (already alluded to) are from 25 to 40 feet in depth. Their temperature is generally five degrees of Reaumur below that of the atmosphere; the variations are seldom above half a degree.

The cost of an acre of vineyard, for red wine of the best quality, varies from 900 livres to 2000. That in Haute Montagne bears the highest price; the second class sells from 300 to 900 livres. The

annual expense of cultivating an acre of red wine vineyard, including the expense of vintage and of pruning, is about 200 livres.

Such are the general details of the culture of the vine in Champagne. There are many vineyards, however, and particularly in St. Thierry, where the greater part of the vines are always raised to the height of about five feet, and supported by props of oak six feet high, and an inch in diameter.

The following are the classes of the white and red wines of champagne.

FIRST CLASS.

White wines.
Ay.
Haut Villers.
Pierry.
Cramant.

Red wines.
Verziato.
Versinay.
Borezy.
Faisy.
Cumieres.

SECOND CLASS.

Avenay
Epernay
Le Meuil.
Avis.
Oger.

Maily.
Damenay.
Epernay.
Rilly.
Montbret.
Ay.
Pierry.

THIRD CLASS.

Tonnere.
Chaldy.
Ludes.
Sadu.
Troispuits.
Villiers.

Joigny.
Tonnere.
Chamery.
Ville Domage.
Parguy.
Saffecomte.

The first class comprises those wines which have long been considered as luxuries at the French, English, and Dutch tables; the second class comprehends wines, which are not much inferior in flavor and quality to those of the first class; in the third class, are comprised the wines most commonly used in France.

As many of the details respecting the management, &c. of the vineyards and wines of Champagne, are applicable to the other wine districts of France, we shall be more concise in our observations respecting them.

II. The vines in the Bordelais, and generally in the higher Guienne and Gascony, are not suffered to lie on the ground like those of Provence and Languedoc, but are supported by poles, something like hops in England. The wines produced in this district, are distinguished into Medoc, Haut Brion, Valence, St. Emilion, De Grave, &c. The best Medoc wines, are Lafitte, Latour, and Margouz. Those of *Vins de Graves*, are Haut Brion, Haut Valence, Morignac, Pessac, Laugon, Villenave, &c. The *Vin de Laugon*, so called from a small town near which it is made, is reckoned the best of all the white wines of the Bordelais, which are included under the general name of *Vins de Graves*, from the sandy and gravelly soil in which the vines grow. It has very much of the claret flavor. There are other sorts in different districts, such as St. Julien, St. Manubert, Pouillac, St. Laurent, Ludon, Maçon, &c. Those which hold the first rank among the white wines, are Carbonnieux, Serons, Barsac, Prigniac, Sauleme, Baume, &c. Of the white wine exported from this district, the total annual amount may be from 85,000

to 90,000 tons. From 20,000 to 25,000 tons used to go to the French colonial settlements in the East and West Indies. About an equal quantity was exported to Normandy and Flanders. Those that are called crude wines of Medoc, are almost all exported to England. The red wines of Haut Brion, Valence, and in general those named De Grave, are sent to Holland, Hamburg, and the Hanse towns. The best red wines of Montferat go to Holland. Those of inferior quality, used to go to the French colonies, or the western departments of the kingdom. The white wines of Grave, Carbonnieux, Marillac, Loegnau, &c. are sent to Denmark, Sweden, and the Baltic; but the best of these go in bottles to Paris. The red wines of St. Macaire, formerly went in part for the use of the French navy, partly to Brittany and Normandy, the rest to Bremen and Lubec.

III. Throughout Provence and Languedoc, the *souche*, or stem of the vine, is never suffered to grow higher than about two feet from the ground. The shoots of the year are always cut down to the stem soon after the vintage. The new shoots put forth every year, are of an amazing length. The grapes grow in a large cluster round the roots of them, and are shaded by the shoots as by an umbrella. The cuttings of the vine are made into faggots for fuel. The vintage begins about the middle of September. The ordinary wines of Provence are not held in much estimation; but there are some of a superior quality, the Muscat wines in particular, which are little inferior to Frontigniac. Roquevarre, not far from Nans, is famous for Muscat grapes. Great quantities are dried for raisins. A wine is made in many parts of Provence, called *Vin cuit*. It is not the produce of any particular kind of fruit, but made from any common white grape, the juice being boiled after it is pressed, till it is reduced about a fourth, which gives it a richness and sweetness, not to be obtained by any other process. The Muscat wines are boiled in like manner, as are also the sweet wines. The process of wine-making is very negligently performed in Provence in general; there is no selection of grapes; red, white, ripe and unripe, are pressed promiscuously together. The method of pressing is very rude and simple. A man, and commonly two or three children, pull off their shoes and stockings, and jump into the vats, where they trample on the grapes till all the wine is pressed out. The only sort of grape used for drying, besides the Muscat, is a large white grape called the *Panée*. Four or five bunches of the fruit are tied together, and then dipped into a caldron of ley of wood ashes and water, as it is boiling over the fire, till the grapes look streaky. Without this process, they would turn black and wither when laid out to dry, instead of retaining their sweetness and moisture. After the dipping, they are hung upon a line for 24 hours, and then separated, and spread upon a sort of hurdle made of reeds, which is laid out in the sun all day, but taken in at night, to protect the fruit from the dew. An excellent sweetmeat is made in Provence, and in other parts of France, by boiling down the juice and pulp of the grape, freed from the skins and stones, till it becomes a rich syrup, when slices of melon, lemon, pears, &c. are preserved in it. It goes by the name of *confiture raisinée*.

IV. The province of Burgundy, in the opinion

of many, produces the choicest of the French wines. The best is made at Baom, Nuits, Romanée, Premeau, Chamberlin, Belz, Coulange, Chassagne, Volenay, Maçon, and Clos-Vougeot.

V. Wine is also the produce of many other parts of France. A great deal of the wines made in the Beaujolais, are sold under the name of Maçon. The wines of Anjou and Orleannois are thick and heady. Auvernat, commonly called *Casse Taille*, is made at Orleans, and is a full good wine. Another Orleans white wine is Genetia. Poitou produces a tolerably good white wine, which resembles Rhenish. Hermitage is the produce of a vine, which is grown upon the banks of the Rhone, between Valence and St. Valliere. Near this also, the *Cote rotie* is made. It takes its name from the hill on which the vines grow, being fully exposed to the warm rays of the south sun, which contributes so much to the excellence of the wine. The average yearly produce is nearly 1000 hogsheads. The true *Vin de Cahors*, which has a great reputation, is the produce of a range of vineyards, very rocky, on a ridge of hills to the south of Cahors, and is called *Vin de Grave*, because growing on a gravelly soil. The wine of Condrieux, a small town in the Lyonnais, on the banks of the Rhone, about seven leagues from Lyons, is very much esteemed. The original plants from which this wine is made, were, according to tradition, brought from Dalmatia, by order of the Emperor Probus.

Luscious wines and liqueurs are common in other parts of France, as well as Provence, of which those of Crotat and St. Laurent are the most esteemed. Frontigniac, a town in the department of the Herault, is remarkable for its excellent muscadine wines. They are the most perfect, and the best adapted for keeping. Lunel, an old town in the department of the Gard, is another place, in the vicinity of which muscat grapes are cultivated in great quantities, the soil being peculiarly suited to them. The muscadine of Lunel is of a more delicate flavor than Frontigniac, but it will not keep so well. The muscat grapes grown here are also dried, and are sent all over Europe. They are called in the country *passerilles*. Aubagne, between Marseilles and Toulon, produces also muscadine wine. The *Malvoisie d'Aubagne*, as it is called, is particularly celebrated. The muscadine of Rivesaltes, a town in the department of the Eastern Pyrenees, is richer than either Frontigniac or Lunel, and comes very near the Cape wine. Bezieres is of a quality inferior to Rivesaltes, Frontigniac, and Lunel. Liqueurs of various sorts are made in different parts of France. Those of Montpellier are most esteemed. In the beginning of the last century, France exported, upon an average of five years, from the year 1720 to 1725, annually, wine to the amount of 20,680,200 livres; in 1778, the exportation amounted to 24,570,170; in 1778, to 83,082,100. The revolution nearly annihilated the exportation of French wines.

The brandies made in France, are esteemed the best in Europe. They are distilled in every part of the kingdom where vines are grown; and in the distillation, not only wines of an inferior, but also those of the best quality, are used. The brandies most celebrated, or made in the greatest quantities, are those of Bourdeaux, Rochelle, Cognac, Charente, Isle of Rhe, Orleans, the country of Blesois, Poitou, Tourraine, Anjou, Nantes,

Burgundy, Champagne, &c. Brandy is also a great article of trade at Montpellier. It is of a milder quality than most of the brandies of the south of France, and therefore better adapted for making the liqueurs, for which Montpellier is so celebrated. Of all the French brandies, those of Nantes, Cognac, and Poitou, which are nearly of the same quality, are the most esteemed, because they have a finer taste, and are stronger. The English, Dutch, Flemish, and Hamburgers, used to take off the greatest part of these brandies. The brandies of Anjou, Touraine, Orleans, which are not of so good a quality as those of Nantes, &c. are most commonly sent to Paris, and into Flanders. In the beginning of the last century, the value of the brandy exported, amounted annually to 5,852,900 livres; in 1778, to 4,660,221; in 1784, to 11,360,200; in 1787, to 14,689,600; and in 1788, to 14,657,300.

Vinegar is made in Provence, Guienne, the Orleanois, Anjou, Aunis, Brittany, &c. The Orleans vinegar is esteemed the best. The flavor of the vinegar made in Provence is also good, but being of a red color, from the hue of the grapes from which it is produced, it has a singular appearance to a person unused to it. The exportation of vinegar in the beginning of the last century, amounted annually to 34,400 livres; in 1778, to 141,893; in 1784, to 124,400; in 1787, to 130,900; and in 1788, to 201,700.

Cider is made in most of those provinces, the climate of which is not favorable to the grape. Normandy is particularly celebrated for this liquor, where they also make brandy of it.

We shall conclude this chapter with a few words respecting French horticulture. The fruit gardens at Montreuil are a curious instance of the accumulation of capital in a small space: these gardens are said to be worth 400l. sterling an acre. All the occupiers are proprietors. The environs of Lyons are celebrated for their excellent artichokes: they are carefully conveyed in great quantities to the tables of the rich all over the kingdom. Vegetables for the table are also cultivated in great perfection in Provence, and particularly about Aix. The country for some distance without the town, especially on the south side, is a continued scene of kitchen garden. The vegetable for which they are most famous, is what they called *cardes*: a plant very much resembling the artichoke, but not growing to a head in the same way. The roots always make part of a Christmas dinner. Aix is so famous for them, that at this season presents are sent of them from thence all over the country. The salads of Aix also, particularly in winter, are esteemed uncommonly good. The tomato or love apple, the *aubergine* or fruit of the purple egg plant, gourds, and capsicums, are likewise much cultivated in the gardens of Provence. The inhabitants of Roscoff, a town on the northernmost point of the department of Finisterre, particularly apply themselves to the raising vegetables for the table; and in this they are so eminently successful, that Brest, Morlaix, and several other towns, draw their supplies almost entirely from them; and they are sometimes sent as far as L'Orient and Quimper, in the southernmost districts of the department. Cauliflowers, brocoli, cabbages, turnips, asparagus and artichokes, are especially produced here in amazing abundance, and of an excellent quality.

But though France has made great advances in the useful branch of horticulture, she is far behind in the ornamental: The strait avenue, the terrace, and the parterre, with formal basins, and jets-d'eau, are still the only objects which, in the opinion of the generality of Frenchmen, can constitute real grandeur and beauty in a garden.

NOTES ON NORTHERN SILK-CULTURE.

Continued from page 375.

Raw silk. The production of raw silk is, properly speaking, an agricultural operation. The inquiry whether this may be made profitable, concerns directly the agricultural interest; and, under what circumstances it should be encouraged, is a question which I propose to consider.

It has been confidently stated, as I have already shown, that raw silk may be produced among us at current prices of labor, for two dollars or two dollars and a quarter per pound. In the cases referred to, however, no allowance was made for land, buildings, trees, manuring, and the superintendence of the proprietor; but only for the actual labor applied; and in Mr. McLean's experiment, the labor of the man was rated at not more than half its customary value. In Mr. Smith's case not only were these items not charged, but likewise the board of the young women employed was not brought into the account. It seems to me then only fair to rate the cost of raw silk at three dollars or three dollars and fifty cents per lb. At 50 lbs. of silk to an acre, this would be a liberal compensation for labor; and any increase of this product would be an increase of profit without a corresponding increase of the cost of production. But this again is making no allowance for accidents. With our inexperience in the silk culture in this country, we are not prepared to say what allowance should be made on this account. The worms are liable to various accidents. They are sometimes swept away by disease in vast numbers, to the sad disappointment and loss of the industrious cultivator. Hitherto, however, as far as my own knowledge extends, few such misfortunes have occurred. The profit upon the production of silk, must depend, of course not merely upon the price of labor, but upon the value of the article in the market. This will of course again depend somewhat upon the supply. Any considerable increase of the product would, as I have attempted to show, inevitably reduce the value. Prices, too, are fluctuating, especially where there is a mixed currency; that is, a specie currency, and a paper currency, which does not represent specie; and when promises to pay are interpreted and qualified at the pleasure of those who make them. No class in the community is more interested in a sound currency than those farmers, who are obliged to hire any labor, and are dependent upon the sales of their produce. The constitution of the country having fixed a standard of value in gold and silver, every other currency is sound so far as, and no farther than, it represents gold and silver. The defiance of their obligations, which has characterized some of the moneyed institutions of the country, and the persevering attempts in some parts of the country to uphold and force a purely paper currency upon

the community, produce disastrous fluctuations; disturb all the sound calculations of honest industry; and in proportion to his means and concerns, the small farmer suffers as severely as those most extensively engaged in commercial pursuits. It is to the deluge of an irresponsible currency, which was by some institutions at one time poured out like water, that we must in a measure attribute those speculations in the multicaulis mulberry, which brought ruin upon thousands. Attracted by the glittering illusion of sudden wealth, like insects round an evening bonfire, they rushed into the flames, where many perished, or escaped with their legs burnt off or their wings singed, maimed and crippled for life. To the same cause we owe every where the interruption and desertion of the quiet pursuits of wholesome rural industry, for the hazardous, and in many cases the immoral pursuits of speculation. Under these circumstances, whether we undertake to manufacture or to produce raw silk, we can at present make no very safe calculations for the future of what the price of labor will be; or what will be the value of the article after it is produced. The attempt, therefore, to produce silk on any large scale, as well as the attempt to manufacture silk, even sewings, must at the present be an undertaking full of uncertainties, but one can hardly say, of doubtful result. The absence of all duties, upon foreign fabrics, exposes us, also, to all the caprices of foreign labor, capital, and cupidity, and the ebb and flood of foreign markets are felt equally upon our shores. Within the last few months, as I have remarked, the prices of many articles of silk have experienced a decline of more than fifty per cent. The best of sewings silk which not long since commanded nine dollars, now sells for six. Ribbons and lustrings are even much more reduced.

Some persons, on this subject of the profits of the silk culture, have had their imaginations raised almost to a white heat, and have thought that the product of raw silk in the northern states, might soon be made to equal the product of cotton in the southern portion of the union. Certainly they do not mean in pounds, but in the value of the article produced. But is it not obvious that any such increase of the product of the article would proportionately reduce the price, though this would again be affected to a degree by another element, which must come into the calculation; and that is, the increased use of the article which would follow any considerable reduction of its price. This would not, however, raise the price, because its free use depends on a low price, and bears a direct relation to the diminution of the price. There is, however, no sufficient reason to think that raw silk can maintain its present price in the country, certainly not in the face of any considerably increased production. The present price of raw silk from Smyrna is not much above \$4 per pound. Bengal silk is lower.

But our silk is said to be much superior to the Indian silk, as it is said, likewise, that silk raised in the northern provinces of China is much superior to that in the south. I have not been able fully to satisfy myself of this fact; nor, if true, can I ascertain whether it be attributable to the influence of the climate, or the superiority of the reeling; but an intelligent manufacturer has stated to me, that, in his opinion, the Bengal silk would be found equal to any other but for the imperfection

of its reeling. It is stated, likewise, on the most disinterested testimony, that the silk formerly raised in Georgia, whose climate, we know, is of a high temperature, was pronounced in England of an excellent quality. The perfection of the Italian silk is generally ascribed to the admirable manner in which it is reeled. It is at the same time, however, only just to state that the silk already produced among us, has fully demonstrated our capacity of producing as good an article as has as yet been seen.

Calculations respecting silk products.—I am aware that I oppose the popular opinion in speaking thus discouragingly of the manufacture of silk in our country. It would be more agreeable to float with the tide than to struggle against it; but whether the opinion of an individual be of little or much weight in the community, he is bound to respect his own judgment, and is at liberty to utter only his honest convictions. Public sentiment and public actions can be affected but in a slight degree by the opinions of any individual; and addressing one's self to intelligent and reflecting minds, no evil can result from the freest discussion. No good will come from creating false expectations; I should be glad to disabuse the public mind of some of the gross illusions by which it has been willingly imposed upon. In some of the documents before me, and those published under authority, it has been confidently stated, that an acre of land planted with mulberry trees may be expected to produce the first year one hundred pounds of silk, and afterwards be increased to 333 lbs., and even to 666 lbs.; and that the profits of such cultivation would be \$1170 per acre. Another person goes on to calculate that one hundred acres even at 180 lbs. to the acre, and silk at 4 dollars per lb., might be made to afford an income of \$72,000. At present these must be considered as mere dreams. If this be practicable, why has it not been done? There has been ample time in other countries, and in this country, to have done it, if it could be done. There have been trees enough, and land enough, and capital enough; and in some of the states a bounty has been offered for some years on the production of silk, admitted by the most ardent friends of the cultivation to be sufficient to cover the whole expense of production. In what country, at what time, was ever such encouragement to production held out before? But no such returns have been obtained or even approached; and, with the exception of Mr. Atwood, before referred to, and Miss Rapp, at Economy, who, until new claimants appear, must be allowed the rank of queen of this branch of domestic industry, it would be difficult, I imagine, to find half a dozen individuals in the whole union who have produced, either of them in one year, one hundred pounds of silk. I myself know not of one. I should have been glad of the honor of recording the names of hundreds who had accomplished it, if they were to be found. Mr. McLean, who has approached more nearly than any other man in the country towards determining what can well be done, admits, with the most credible frankness, that he despairs of ever seeing 104 or 128 lbs. of silk produced upon an acre. I cannot say with him, that I despair of such a result; but I shall wait for further trials before I am prepared to say, with confidence, that more can be done than what his remarkable in-

telligence, skill, and enterprise have affected. In respect to the actual cost of producing silk, that as yet is by no means settled. Mr. Mc. Lean's experiment, which has come the nearest to determining this matter with exactness, is, as I have shown, far from doing it. First, he made no allowance for land, trees, rent of buildings, cultivation, and superintendence. Second, he charged the man's labor and board at half the price, three dollars per week, which it would cost with us. Third, he states distinctly, that his silk cost him much more than two dollars a pound, though he thinks that it may be produced for this sum; that is, as I understand it, the mere labor of producing it can be paid for by that sum, in his judgment.

ON PLOUGHING IN CROPS FOR MANURE.

From the Third Report of the Agriculture of Massachusetts.

Boston, March 25, 1840.

Dr. S. L. Dana,—Dear Sir,—Two successful and experienced farmers, one in Franklin and one in Berkshire county, have come to the conclusion that, in turning in crops by way of enriching the land, more benefit is derived, that is, the fertility of the land is more advanced by ploughing in a crop after it has become dried or dead, than by turning it in in its greatest luxuriance and greenness. One of them showed me the results of an experiment tending to this point, which appeared strongly to favor his conclusions. A well-established fact is better than the most elaborate hypothesis; and prejudices, however strong, must yield to facts.

Allow me under these circumstances, to inquire whether, upon your principles or philosophy of vegetation, there occur to you any good reasons for a result so much at variance with popular opinion. Your views in full on this subject, will add to the obligations under which you have already laid the public and your respectful friend and servant,

HENRY COLMAN.

Lowell, March 28, 1840.

Dear Sir,—The results referred to in your letter are opposed to the common opinion. Common opinion, especially in agriculture, is not always founded on observation. It is oftener prejudice, than opinion; and, when inconsistent with well known facts, has not its source in observation or experiment. The whole resolves itself into this, *dry plants give more geine than green*. This follows from the little we know of the process termed "fermentation;" I use the term as commonly expressive of the spontaneous decay of vegetables. It includes the three stages of vinous, acid, and putrefactive fermentation. These are not necessarily dependent, following in regular progression. They are not cause and effect. Putrefaction may commence first, and it is so different from the other two, in all its stages and products, that the term "fermentation" ought never to have been applied to it. The greater part of vegetables are susceptible of putrefaction only, a small number become acid at once, and a still smaller number ever undergo vinous, acetous, and putrefactive fermentation. Fermentation then, in its widest sense, will help us to understand how dry crops may be better manures than green. Let us glance at the principles and products of fermentation.

1st. What vegetable substances are susceptible

of the vinous fermentation, and what are its products?

The juices only which contain sugar, or starch, convertible first into gum and then into sugar by the action of azotized vegetable principles, especially gluten. Pure sugar never ferments. The vinous fermentation must be excited by some substance containing nitrogen. There are three things essential to vinous fermentation, air or oxygen gas, moisture in due proportion, and a temperature never below 50° F., nor above 86° F. The products of this process are gases, ferment or yeast, and vinous liquor. The gases are carbonic acid, and hydrogen. The yeast proceeds from a change in the organization of the gluten and albumen; some late French experimenters think it proceeds from a continued evolution of infusorial plants, hence yeast begets yeast, like sowing crops of seed. However, let us leave speculation. The main facts are as above stated. If, then, we plough in green plants, we put them in a temperature favorable to the commencement of vinous fermentation; we bury them full of sap—the requisite moisture for vinous fermentation;—we cover them, whilst their saccharine principle is in its perfection. Every thing favors vinous fermentation. The sugar and starch of the plant fermented by its gluten and albumen, are converted into gases and alcohol, the former are lost in air, the last washes away or is changed to vinegar. All that remains for the farmer is the altered gluten and albumen, which soon putrefy and form geine. All the starch and sugar of the plant are thus lost.

2d. What vegetable substances are susceptible of the acid fermentation, and what are its products?

The substances are, first, sugar, which in certain cases, becomes acid, without undergoing vinous fermentation; second, gum. The circumstances essential to acid fermentation are air, moisture, and a temperature from 65° to 70° F.; acetic acid is itself the proper ferment of acid fermentation. Vinegar, as is well known, singularly promotes the formation of vinegar in vinous liquors. The products are: carbonic acid, acetic acid or vinegar, and some other acids, especially that called nanceic or zumic acid, which, if not lactic, is perhaps only acetic acid, holding in combination some azotized substance. This acid combines with the alkaline and earthy ingredients of plants and soils, and forms very soluble salts. Green plants, ploughed in, are at once placed in a situation most favorable for undergoing acid fermentation. We suffer a loss of a part of the carbon, and in addition to the sugar and starch, we now lose the gum of the plants. All these are capable of producing geine, and hence in ploughing in green crops, we lose a portion of manure.

3d. What are the vegetable substances susceptible of putrefaction and what are its products?

With the exception of oils, resins, &c., every organized part of every vegetable may putrefy. The circumstances essential to this process, are air, a temperature not below 45°, and moisture. No perfectly dry plant ever putrefies, nor with a moist one, if air is excluded. I have had a capital example of the last, in a piece of a white birch tree, dug up from a depth of twenty-five feet below the surface in Lowell, this winter. It must have been inhumed there probably before the creation

of man, at least at a time "whereof the memory of man runneth not to the contrary," yet this most perishable of all wood is nearly as sound as if cut from the forest last fall. A dried plant has perished with most of its sap, that moisture essential to the commencement of vinous and acetous fermentation. During the very act of decay, from the moment when its living functions have ceased, new combinations of its elements begin. It has already begun to be destroyed by the very agents which gave it life. This is the beginning of putrefaction. Let us not be deceived by a name. Putrefaction we always associate with disgusting effluvia. But in the wide sense we have defined it, it includes also the fragrance of new hay. Whenever bodies consist only of oxygen, hydrogen, carbon, and a trace of azote, their putrefaction is fragrant, or inodorous; when, in addition to these, bodies contain large portions of azotized matter, gluten, albumen, or sulphur, and phosphorus, putrefaction evolves abominable odors. To the agriculturist, putrefaction is always a wholesome process, beneficial to his best interests, when promoted and controlled. There is only one case, where this process produces loss. This may be termed *destructive putrefaction*; it is produced by heaping together green plants, or sometimes by moistening dry vegetable substances. Here oxygen is rapidly absorbed, and finally the mass takes fire, and burns. Up to the moment of inflammation this is putrefaction. New hay, stacked too green, is a familiar example. Volumes of steam are evolved, which proceed partly from the decomposition of the plant; decompositions, and recompositions rapidly ensue; these are the ferment, which keeps up the action till the plants burn. Doubtless, all green plants, ploughed in, undergo to a greater or less extent destructive putrefaction, which succeeds the vinous and acid fermentations, perhaps caused by the very rapidity of these processes. Hence, in addition to the sugar, starch, and gum of the plant, we lose a large portion of its other substances, by turning it in green. The products of this rapid fermentation have been but little studied. Happy the farmer who never witnesses the process. He should never induce it, and may generally prevent its extension, when once begun. It is a dead loss to him; but in all other cases of putrefaction, the products are valuable. These vary according as the process takes place: 1st, in air; 2d, at the surface of the ground; or, 3d, deep in the interior of the earth. The last need not detain us—it produces all the varieties of coal.

1st. In the free air, having access to all parts of a plant, putrefaction produces carbonic acid, nitric acid, and water. But ordinarily, in the air, as oxygen does not find ready access to all parts, a portion of the hydrogen of the plant combines then with the carbon, sulphur, phosphorus and azote of the plant, and we have carburetted, sulphuretted, and phosphuretted hydrogen, and ammonia produced. Now, as these exist but in small quantity in vegetables, the loss of hydrogen will not be very great by drying the plants, and it is possible, that the removal of these may cause the other elements to enter into more stable combinations, better fitted to produce geine. In all cases of putrefaction in the open air, oxygen is absorbed, and an equal bulk of carbonic acid given out, while, at the same time, the oxygen and hydrogen of the plant escape

as water. The result is, that in the substance left, carbon exists in a greater portion, than in an equal weight of fresh vegetables. In all cases of putrefaction, new products are formed; these again resolve into others; and this action goes on till we have no longer any organic products; we have only binary or inorganic substances left. All our researches into the philosophy of the changes in fermentation, terminate in these binary products, that is, in compounds, consisting of only two elements. During all these various changes, a variety of substances must, of course be formed. As the elements of living, so the elements of dead plants, are continually changing into new forms. Nature is admirably simple, and never so learned as our books. We ought not to dignify with a new name, every new product of putrefaction, which we may fortunately arrest. However various these products may be, whether products or educts of putrefaction or of our analytical methods of separating them, all putrefaction at the surface of the earth, ends by forming a brownish, black, powdery mass, which combines with the alkaline, earthy and metallic bases in the plant. This substance has been called "*geine*." As I have elsewhere defined it, it is the decomposed organic matter of the soil. It is the product of putrefaction; continually subjected to air and moisture, it is finally wholly dissipated in air, leaving only the inorganic bases of the plant, with which it was once combined. Now, whether we consider this as a simple substance, or composed of several others, called crenic, apocrenic, puteanic, ulmic acids, glairin, apotheme, extract, humus, or mould, agriculture ever has, and probably ever will consider it one and the same thing, requiring always similar treatment to produce it; similar treatment to render it soluble when produced; similar treatment to render it an effectual manure. It is the end of all compost heaps to produce soluble geine, no matter how compound our chemistry may teach this substance to be.

Among the many economical modes of producing geine, the ploughing in of vegetable matter, has held a high rank. Nature teaches us to turn in the dried plant. Dried leaves are her favorite morsels, and the very fact, that Nature always takes the dried plant, from which to prepare the food of growing vegetables, should have taught us long ago, the wisdom of ploughing in dry crops. The careful collecting and husbanding of dried leaves, their superior efficacy in forming compost, bears witness to the facts stated in your letter. That the use of dried leaves for compost has not led to the turning in of dry crops, has probably arisen from the consideration, that a greater quantity of geine may be produced, by turning in two or three green crops in a season, than by one crop of dry. This needs experimental confirmation. The very act of tillage, on Mr. Keely's plan, by exposing the insoluble geine of one crop, to air, renders it soluble, while, at the same time, two or three green crops must form a greater quantity of salts. If only one crop can be turned in, let it be dry. All our philosophy, and the late experiments of your agricultural friends, confirm this view.

With great respect, I am very truly, yours,
SAM'L L. DANA.

REV. H. COLMAN,
Agricultural Commissioner.

CORN SOWN BROADCAST.

From the Southern Cultivator.

In a small enclosure belonging to Mr. D. F. Moore, of Spring Hill, in this county, we noticed what, at first, we supposed to be a beautiful and luxuriant stand of millet. It turned out, however, to be Indian corn, sown broadcast, at the rate of about two bushels per acre, and intended for the scythe while green, and to be fed to milch cows. On inquiry, we were informed by Mr. Moore that this is not now an *experiment* with him, having been tried with the most satisfactory results heretofore. He states that it produces a great quantity of green food, succulent and nutritious, on which his stock feed with delight and thrive rapidly. We should be pleased, however, to see more careful trials repeated with it; doubting, as we do, notwithstanding its great succulence, whether there is indeed much nutrition in the young stalks and blades when cut so early.

WOODLAND RYE.

From the Southern Cultivator.

Five miles from Nashville, on the Franklin turnpike, we saw a woodlot sown in rye, which we are told belongs to Mr. F. McGavock. This lot we learn was quite promising early in the spring, before the leaves of the trees were out. It now, however, evidently suffers with shade; the rye looks watery, jointed and innutritious, and is thinly scattered over the surface of the lot. Such portion of it as matures, will, if suffered to stand, doubtless deposit seed enough to cause a second crop to spring up. In this way many crops may follow, without the cost of sowing or cultivation. Yet we incline to the opinion that *rye in woodland* will after all prove to be of but little profit. In the first place, the seed and rye-crop must, under such circumstances, deteriorate every successive season. Secondly, the seeds of weeds, unless the ground is regularly ploughed every fall, will ripen and multiply, till eventually the rye will be completely choked and destroyed. In the third place, the same woodland, sown down in our native blue-grass (or one of many other cultivated grasses,) would be rendered permanently and doubly more valuable for grazing, whilst it would be kept free from weeds. We hope, however, that Mr. McGavock will carefully note and accurately give to the public the details and result of this experiment, whether they be favorable or otherwise.

LUCERNE.

From the Farmers' Cabinet.

Sir,—As I consider the Farmers' Cabinet the channel through which we first obtained information, in this part of the country, respecting a crop which is likely to make a great stir among us, I think its pages should be devoted to the record of any circumstances which might be found to arise relating to its culture, which, if I mistake not, is about to engross a considerable share of the attention of the agricultural community throughout the

union. I must, however, deprecate a *Merino-multicaulis-mania* in the future prosecution of the matter; let us sit down "*doggedly to the task*" of examining its real pretensions, and the best modes of introducing it to notice, by proper cultivation on suitable soils and under favorable circumstances, and record the result.

The accounts which appeared some time since in the Cabinet, relative to the crops of lucerne in the island of Jersey, (England,) seemed at the time, to say the least of them, very astonishing; and if they had been supposed to be *quite correct*, must, ere this, have called very general attention to the cultivation of that crop amongst us; unfortunately they came upon us just at the time of the *morus fever*, when we did not suppose that we should ever require any other mode of *making bread*, and people could think of nothing else; and since its disastrous exit, they are inclined to consider such flaming accounts as mere moonshine, and will not, yet a while, consent to be led away by "*such another ignis fatuus, such another dance.*"

I am drawn to this subject at the present moment by reading conflicting testimony, for and against this crop, in the papers of the day, and cannot but think the time is approaching when such very wide differences must be reconciled by practical experiment, and that too by those to whom such employment will be legitimate—by the *real cultivators of the soil*—not men of all other denominations and persuasions, as was the case in the cultivation of the *morus multicaulis*, and the breeding of Merino sheep. I find, according to the eastern papers, that the cultivation of lucerne has been tried in several places in that country, and has totally failed; while in the Baltimore American Farmer, for the 29th April, there is a particular account of a crop which has as signally succeeded—accounts as opposite as *north and south*, and which, possibly, is the main cause of such discrepancy; at the same time, much also must depend on the very opposite nature of the soils in these distant regions; that of the eastern states being about as unsuitable to the growth of tap-rooted plants, extending to the depth of ten or twelve feet into the subsoil, as can possibly be imagined—proverbially rocky, swampy and cold—while on the light and warm soils of Maryland, nothing would seem more suitable than a crop which draws its support, even during the hottest seasons, from a depth far out of the reach of the severest droughts.

Now I must be permitted to profess myself an advocate for the cultivation of this plant in our country; but I do not indulge myself in the idea, that it is suitable for all soils, situations and circumstances. And although I have seen it growing luxuriantly in a small quantity, adjoining the fence of a cottage on the hill, above the sugar refinery of John Brown and Co., at East Boston—and where it might still be found, I have no doubt—and have failed in my attempts to raise it on the warm sands of Jersey, under the most careful treatment; still, that it may be raised in this country with perfect success, in suitable situations, I am as thoroughly convinced as I am of my existence; but I do not think it can be done to any good purpose in the eastern states generally, or on those lands which have moist and poisonous subsoils: these last are destructive to its growth, the deleterious matter being taken up by the tap-

roots of the plants, in the way described at page 18 of the 3d volume of the Cabinet. The spot at which I attempted the cultivation in New Jersey, was at a farm near the Delaware, three miles above Camden, where the owner gave me a piece of his garden for the experiment: the seed came up very quickly, and the progress of the plants was truly astonishing, and until they were about a foot or fourteen inches in height, all appeared as it should be; but my next visit convinced me that there was an end to all my hopes: the under leaves had turned yellow, and the tops of the shoots were sharp and pointed, and showed that they were struck at the root, of which I was convinced on digging them up, for their tap-roots, all of them, were cankered and rotten, and broke easily, even by gentle handling: still these plants, after the decayed roots were removed, would grow and flourish, when planted in a drier spot, for a considerable time, but when their roots had again reached the poisonous subsoil, they would again become prostrated.

My experience in raising this astonishing crop has been pretty extensive, and as I have long been convinced that it is peculiarly suitable to many parts of this country, I would detail a mode in the culture, which, in suitable situations, and under favorable circumstances, would, I am convinced, be attended with perfect success.

The land designed for it should be summer-fallowed, the weeds being carefully gathered after every ploughing, and not a moment should be lost in bringing forward as many crops of seed-weeds as possible, by frequent ploughings and harrowings, turning them down as fast as they come. Before the last ploughing a covering of well-rotted manure should be spread on the land, and this being turned in, the seed, twelve or fourteen pounds per acre, should be sown, broadcast, in August or September, unaccompanied with any crop, and be immediately rolled in. In the middle and southern states there would be no danger of its being injured by the winter cold, provided it be protected by the usual quantity of snow, and although the weeds, which might still remain in the soil, may spring up with the lucerne, yet as they would be prevented from growing in the winter, that crop would shoot earlier in the spring than they, and would soon out-top and overgrow them; while four or five cuttings of the lucerne during the next summer, would prevent these weeds from obtaining even a chance of success.

It is a mistaken idea that lucerne requires a rich soil: this is by no means the fact; indeed I have known several attempts to raise it on such soil, in consequence, I have thought, of this very circumstance—but a *suitable* soil is quite necessary, and what that is, is not sometimes easily definable beforehand; but experiments on a small scale will soon point that out. The *subsoil* for this crop is of much more importance than the *surface*, and the most prolific crops have been obtained from soils supposed too barren to produce any profitable yield whatever. Ashes form an excellent top-dressing for lucerne, as they contain no seeds of weeds, and this is a circumstance of incalculable importance to its future well being: all other manures should be applied during the frosts of winter, for before the seeds of the weeds, which might be contained in them, can vegetate in the spring, the lucerne has started, and will then keep the lead:

and when the crop has taken full possession of the soil, nothing appears more tenacious of life, or equal to cope with it, especially during a season of drought, when all other vegetation has disappeared from the face of the earth; then, I have often known it to shoot away at the rate of two inches in height every twenty-four hours. It has been the custom in some places, to raise the crop on a seed-bed, and transplant the roots, but this is changing the nature of the plant, for its peculiar characteristic—a tap-rooted plant—is thus destroyed; and however much it might thereafter flourish on good soils, it is not so fitted to *pump up*, from the depth of twelve or fourteen feet, moisture sufficient to sustain a crop of eleven tons per acre, during the hottest season of the year; nor is it after that, so well able to cope with the weeds, as its strength is never so great as when its roots are deep, and forms a woody crown about three inches in diameter, bidding defiance even to the ploughshare, and seeming to gain strength from the roughest treatment.

Nor is the very general practice of drilling the seed, and keeping the rows clear of weeds by the hoe, at all to be recommended; it is thus made to flourish, but it is at the cost of too much labor and expense; nor have I ever known a hoed crop at all to be compared with very many that I have seen broadcast, and which had been raised with little expense or labor. The observation, at page 258, vol. 3, of the Cabinet, that unless the lucerne crop is sown in drills, and kept clear by hoeing, it will never answer to the farmer, is erroneous—nothing can be farther from the fact—thick sowing in the autumn or late summer, on a clean and suitable soil, will render quite unnecessary drilling and hoeing; and will insure larger crops than can be obtained by any other mode of management.

Lucerne has been denominated an impatient crop, but on soils when suitable, nothing succeeds so well, or with less trouble; the seeds start in a very few days, and the growth of the plants is at first as decided and rapid as the common red clover; but it must be admitted that, after this, it seems ready to give way to a crop of weeds, and the most promising prospect is often destroyed in a few days. But to those who are acquainted with its habits, the cultivation is neither difficult or hazardous; and when it once decides the question “to grow, or not to grow,” in the affirmative, there is no crop on earth that can at all keep pace with it; and it is then a crop for life, or thereabouts. The best crops which I ever knew, were those which grew on the sea-shore, not two feet from high water mark—nay, I have known it grow and flourish on the sea-beach, overflowed by every spring tide, without suffering the least injury from it. Those crops grew on white sand, with not a particle of earth to be seen in its composition, and there were, of course, no weeds to impede its growth; but, at the depth of several feet, this bed of sand was found resting upon a substance of fine light mould, into which the roots had penetrated, and produced crops which were truly astonishing in their bulk and vigor; and upon these fields it had been customary to tether cows during the whole summer, for ages, without manure, and yet no diminution of its strength was ever dreamed of. During the whole of the winter, not a blade of lucerne was to be seen, the roots had all been

covered by a light coat of sand, which had been blown up from the beach: this protected the crop from the frosts; and very early in the spring, the shoots of lucerne would be found penetrating it in all directions, like asparagus plants, and in a few days they would spread the surface like a carpet, furnishing, in about the space of two weeks, excellent food for cattle of every description, and upon which hogs would fatten, fit for slaughter; it being remarkable that these last, after masticating even the woody stalks of the plant, would not eject any portion of it, but swallow the whole.

In my next, I may resume the subject of the cultivation of this remarkable crop, and in the meantime offer my best wishes for the success of your valuable work.

VIR.

May 28th, 1840.

P. S. Any of our friends intending to enter into the cultivation of lucerne, should immediately prepare, by summer-fallowing the land, harrowing after each ploughing, to encourage the weeds to vegetate, destroying them by turning down, and harrowing for a fresh crop immediately.

SILK CULTURE OF THE EARLY PART OF THIS SEASON IN BRUNSWICK COUNTY.

To the Editor of the Farmers' Register.

Lawrenceville, July 3, 1840.

For some years I have been impressed with a strong belief that the raising of silk worms might be made a profitable employment in this state, and that it would give to numerous persons, whose labor now yields little or nothing, the means of comfortable support, if not a competent independence.

After the price of multicaulis trees fell down to almost nothing last fall, and many of my neighbors could not dispose of what they had raised, I determined to make a fair experiment of what could be done in raising a crop of silk worms—I say a crop, by which I mean a summer's or a season's work at that business. Not having trees enough myself, all my neighbors, who did not intend to feed worms themselves, promptly and liberally put their trees at my disposal, so that I had some 30,000 good trees of last year's growth to feed from. Being determined to give the thing a fair trial, I proposed to three ladies of our village, namely, Mrs. Thomas S. Gholson, Mrs. Wm. B. Wilkinson, and my sister, Miss Martha Hicks, if they would, with their house servants, attend to feeding, &c. that I would have an old dwelling house in my yard (24 by 18, two stories high) fitted up for worms, get every thing necessary, and after reimbursing the outlay for the crop, they should have all the profits. The ladies accepted this proposition, and have progressed as I will hereafter tell you. I intended to wait until we had gone through the season, and then to have given you a full detail of all we did, how we succeeded, and how we failed; but as it has been urged upon me that even the little experience we have had might assist some young beginners like ourselves, during the present season, in their praiseworthy efforts to establish this most important branch of industry; and with the hope that it may have that effect, and if nothing better, that it may cheer and encourage some desponding friend of the cause, I have abandoned my original

design, and now send you an account of what we have done up to this day.

Last summer I requested Mr. Dwight Huntington, of Mansfield, Connecticut, to look out for the best worms in that place, and from them save me some three or four hundred thousand eggs. Mr. H. is well acquainted with the business, and has been familiar with it for 30 years. He put up 300,000 large sulphur eggs, and 70,000 large sulphur two-crop eggs, remarking, in his letter on the subject, that the two-crop worms were the largest he had ever seen. The eggs were kept by him until the coldest weather of last winter, when he brought them to N. York, and himself put them aboard of a vessel for Petersburg, taking care to stow them in a part of the vessel free from the influence of fire. As soon as the ice permitted, the vessel arrived at Petersburg, and my brother, Mr. L. F. Hicks of your town, lost no time in forwarding them to me. I received them in February, and immediately put them on ice, where they remained until taken out for hatching.

Being all of us entirely unacquainted with the business, except so far as we could be informed from books, we judged it prudent to begin with what we considered a half crop, and put out the two-crop eggs about the 20th April. They began to hatch about the 12th day, and completed their work in about 35 days. My friend, Mr. Huntington, over-estimated the quantity of eggs; instead of being 70,000, there are not more than 45,000. We gathered 13½ bushels cocoons from these worms. About ten days after exposing the first eggs, we exposed half of the large sulphur eggs, which began to hatch on the 13th day, and taking the medium of the different days' hatching, I will say they all hatched on the 25th May; these are all now spun up, but I have not yet gathered them. We think there are about 100,000 of these, and we hope to get 30 bushels more of cocoons. Following up the plan we had adopted about two weeks after the last eggs were exposed, we put out the residue of the large sulphur eggs, and they began to hatch on the 8th day after exposure; and taking the medium as before, I will say that they hatched on the 21st day of June. They are now moulting the second time, and are about 120,000 in number. If they do as well as the others, we hope to get some 30 bushels of cocoons from them. We have now exposed a full crop of the eggs of the two-crop worms, laid about five or six days ago; and if we do well, shall put out, according to our plan as above stated, another crop of eggs, so as to make five successive crops in the season.

After stating what we have done as succinctly as I can, I will now proceed to make some general observations, which may not be unacceptable to young beginners like myself. In the first place, too much importance, in my humble judgment, cannot be ascribed to the eggs, the purity of the stock from which they come, and the proper keep of them. If either be neglected, nothing can prevent the mischiefs which will instantly result. Of course none who begin this business will be so imprudent as not to have leaves enough for their worms, without stint. If there should be such a one, he must fail. With plenty of food, and good, sound, well-kept eggs, it seems to me that, without casualties which no prudence can obviate, no one ought to fail.

From first to last, through the dampest season

ever known in this country, we have lost no worms from these eggs by disease. We have never let wet leaves if we could help it; but there have been many days that we have been obliged to do so, or let our worms go without food; no injury was observed from it. I have gone by the directions of Mr. Gideon B. Smith, of Baltimore, whenever I have been at a loss, and have found them always right. My friend and relation, Mr. Thomas Hicks, also, has visited us frequently, and has always given us advice and hints which gave us much assistance.

By the first opportunity I will send you a sample of the cocoons, both of the two-crop and large sulphur variety; 2612 of the former, taken as they came, after being flossed, made a bushel, and are allowed to be the largest ever seen in this country.

I have used no artificial heat whatever; the worms have taken the hot and cold, wet and dry, as God sent it. I had the house stripped of every thing to a mere hull, fixing the windows with blinds which I believe are peculiar to this country, and no more trouble to make, and cost no more, than the coarsest shutter. Any house that will keep out the sun and rain will suffice for the healthful accommodation of the worm, always taking care to have it well ventilated.

Of course it will be desirable to know how much labor has been expended in our small establishment. I am sorry I cannot be very precise on this point. My lady partners agreed amongst themselves to take the feeding, day and day about. Each had a woman and small boy about 12 years old, who were amply sufficient for all purposes, except when the worms had to be moved, or thinned, or cleaned off, or fixed to spin, or to gather and cure the cocoons; and in their last stages it required more help to get leaves and feed them. I think I can say, however, with certainty, that for half the time the woman and boy would be ample to do every thing; and for the other half, double that force would be sufficient—the cocoons after being taken down to be handed over to other hands.

I have stated that all the worms from the Connecticut eggs were entirely and completely healthy. But I think it right also to state, that in my absence from home a parcel of worms were placed in the house, which had been presented to the ladies by a gentleman of the neighborhood, which had commenced hatching in his cellar, and of course were hatched out of time and unexpectedly. As soon as I was informed of it, I objected to it and expressed a wish that they should be removed from the house, stating, at the same time, the warning I had received from books and persons against feeding worms hatched either in a cellar or ice-house; but the ladies were too tender hearted to throw away the little creatures, and they were suffered to remain. There were some eight or ten thousand of them, and they were kept in the garret of the house, to themselves. They looked well, and to every appearance were as healthy as any in the house, until they began to spin. Then they began to turn yellow, and to sicken, and to die, and finally not one third of them spun a cocoon, and those which did spin did their work like invalids. In a few days no one could go into the room without feeling ticklish about the stomach: it was a complete failure. Whilst I am on this subject, it will not be improper to state that I have heard of three different in-

stances in this vicinity of worms afflicted with what we call the yellows, being revived by immersion in cold water. (I suppose sprinkling would do as well, but I beg the advocates of these respective creeds not to consider me as taking sides with either.) One happened with Mr. Thomas Hicks, who told me that they spun after they had been immersed. Their being put in water was with no design to cure, but to kill them. A parcel in this place were thrown in the creek, and some boys picked some out, which spun good cocoons. I did not see it, but the persons from whom I got the information are as respectable as any in the country. The other case was, at Clack Robinson's, esq., Robinson's Ferry, Warren county, North Carolina. I had it from Mr. R. himself.

It may be desirable to know what others are doing in Brunswick. I can only say what I have heard, having myself been too much confined to our own, to see much of other people's cocooneries. In every instance where they have used eggs from a bad stock, or of bad keep, they have failed; and in every instance where they have had eggs from a good stock which have been well kept, they have succeeded. I saw Dr. N. W. Lewis yesterday, who told me that his first crop was a failure from bad eggs; but having procured some good eggs for his second crop, he had complete success. Mr. Hugh L. Percevall informs me that he obtained a parcel of eggs from a gentleman in this county, (the one who presented the ladies with the worms above, and some of the same eggs,) in February, and put them on ice; that he hatched them out in May, and they have done well—no sick ones among them; a proof that if these eggs which have been extensively used here, had been put on ice in January or February, instead of being kept in a cellar, that all would have succeeded who used them, for they were from an unquestionably healthy stock. Knowing that this gentleman had a large quantity of eggs from a healthy stock, I took it upon myself once to mention to him the importance of putting them on ice, early. He remarked that he thought his cellar was cold enough, and, I understand, kept them in the cellar; and Mr. Percevall's lot is the only one of which I have heard, which has been successful. John L. Wilkins, jr., esq., informs me that he has had good success, and is feeding largely, and is preparing to feed on a very large scale. He will, no doubt, as well as the others I have named, give to you, and the public, the benefit of his experiments.

I fear I am taking up too much room for one who is so green in this great business. I give you permission to leave out any part which you may think proper, for I have no ambition to appear in print, and have taken no more pains in preparing this than if I had written it for yourself individually.

Before I conclude, however, I beg leave to say to all who are going to embark in this business, that after they have provided a full supply of food, eggs without stint, from a healthy stock, and keep them sound, with industry and attention, they may reasonably expect to do well, and their own experience will be their best instructor. Let no one flatter himself, or herself, that silk is to be made without labor, or attention. Omnipotence has decreed that we must get our living by the sweat of our brow; and we can do nothing in this

or any other pursuit without a copious sweating of the brow.

I think that it would be well to use eggs more liberally; they are the seed of the silk crop, and should be sowed liberally, so that all backward and underling worms might be thrown away; and as mistakes and miscalculations are frequently made as to the quantity our house will hold, we should never have too few to fill it. After a little experience, however, this will be better managed; but to all persons it will happen, if they aim just to hatch as many as they think will fill the house, that they will offend by having too few than too many. Hatch out enough; throwing away is easily done. I would also suggest that it will be best to hatch out what you intend to fill your house at four different times, at intervals of about a week.

When we have completed our labors for the season, if any thing worthy to be communicated shall turn up between now and then, I will send it to you. We saved eggs from four bushels of cocoons of the two-crop worms, which have been all sold before they were laid, at \$5 the ounce.

With great respect, yours, &c.,

E. B. HICKS.

[The foregoing report is highly gratifying, and especially as it relates to the labors of the ladies. The few cocoons which were sent as specimens with the communication are very good. We hope that the subsequent operations of the persons now reported of, and all others in Brunswick who have made careful and accurately observed experiments of rearing this season, will be reported by the experimenters, for publication in the Farmers' Register.—ED.]

EXPLANATIONS.

To the Editor of the Farmers' Register,

June 25th, 1840.

The cold, cloudy, wet weather arrested the growth of my corn, and prevented me from "laying it by," until 23d of June. It is good, but not such as I wished, or expected; but for public use I put it directly upon the great north and south road, that all might see and bear me witness that I speak in truth of the resurrective power of dead land.

My wheat, that far outstripped every thing I had ever owned or seen in this country, is a total failure, not making upon 100 acres 10 bushels. I leave it to the knowing to account for this failure; but I impute it to the long continued rain which aided the lime in preparing more food than the growing plant could dispose of it, consequently ruptured the stalks of wheat from top to bottom, and caused what is called rust. I do not think that one stem escaped in 100 acres. My oats and grasses are all I could wish or want. I have been for eight days in bilious fever, and taken so much calomel, that I have nothing in me to spin you a longer thread. My very bad health may make this my last communication: let me, therefore, shake you cordially by the hand. Grass and lime must and will restore our beloved Virginia to full double her virgin production. Fear nothing, for I am

within bounds, except where nature has placed the seal of poverty.

FAIRFAX.

SPINNING PERFORATED COCOONS.

From the Journal of the American Silk Society.

The following letter is from a respectable lady, from whom we some time since received a sample of silk stocking yarn of a very superior quality, made by her from perforated cocoons, and to whom we applied for a detail of the operations by which it was produced. We are sure the letter will be very acceptable to our readers. We shall add but a single remark, and that only to call the reader's attention to the writer's estimate of the labor required to produce silk stocking yarn, compared with that of flax:

York, June 12th, 1840.

GIDEON B. SMITH:—Thy letter of the 4th was received, and I felt some difficulty in giving a very correct account of the manner the cocoons were prepared for spinning, as they were considered of little or no value, and altogether so carelessly attended to, that we were much surprised that the yarn produced from them was considered worthy of any particular notice; and I would not have thought of sending or showing it to any one; but Joel Fisher, a friend of ours, called on his way to Baltimore, and asked for a skein to take to G. B. S. as he thought it superior to that thee had when in York.

Our having silk worms at all was merely accidental, sent to us by a friend; we knew nothing of their nature; had not even seen one before. But when we had them, depending on us for food, we found it both necessary and pleasant to make ourselves better acquainted with their habits and worth, and collected and read many works on the subject, and soon found ourselves greatly interested in them.

When the cocoons were formed they were taken by a gentleman, an acquaintance of ours, who was much interested in raising silk; but as no reel was to be had in York at that time, he let the worms cut through for the purpose of procuring eggs. In the autumn the cocoons were returned to us, but as we considered pierced cocoons of no value, they were thrown aside. Some time before Christmas they were re-collected, and divided into two parcels, and each put into a bag and boiled.

To sixteen pounds of cocoons, weighed immediately after spinning. I took five quarts of soft soap and as much soft water as was sufficient to cover the bags, and boiled well perhaps four hours; when cool they were hung up to dry, or rather to drain, as I thought wringing or pressing the water out would mat the silk and produce lumps. The next day they were put into water again, with the same quantity of soft soap, which I think is better than hard soap, and boiled again perhaps an hour, when they were well rinsed in clean water and hung up to dry.

When quite dry they were spun on a common flax-wheel, by holding the cocoon in the hand and beginning at the pierced end; the silk comes entirely off, leaving the shell bare.

We took some pains to ascertain whether there were stocking weavers in Baltimore, who would manufacture the yarn for us; but not being able

to hear of any, (though no doubt there are,) I spun the yarn coarse, for the tedious process of knitting. I could easily spin 180 cuts from one pound, and a person accustomed to spinning flax, (which I am not,) a good spinner, would produce 200 cuts with the same ease that 48 are spun from flax; and I think the amount of labor in raising silk is about one-fourth of that of flax. The process of knitting being tedious, we have no stockings to spare, but if yarn sufficient to make a pair will be accepted, there is entirely welcome to it; and the first conveyance we hear of, we will send it by. We have given to some of our friends, who advocate the silk cause and were willing to accept it, but would rather not sell any.

I feel fully my incapacity for instructing the public in raising or manufacturing silk, and would much rather not have my name in the Silk Journal.

Respectfully, ———.

HAYING. EARLY GATHERING.

From the Boston Cultivator.

Hay that is carted as early as three o'clock, P. M., is kept much sweeter than that which is carted at sunset—the first will become more dry as the heat is retained in it,—we have been surprised at the difference between two loads of wheat, the one carted at three and the other at sunset,—both were equally well cured in the field, but on pitching it over for thrashing, the first was perfectly dry while the straw of the latter was damp and musty. Neither hay nor grain should be carted after the dew has fallen copiously. It is safer to pack them both and take another day.

We have uniformly found it best, after the experience of more than forty years, *to dry our hay in the sun*. We are extremely sorry to be obliged to differ from such high authorities as we have seen on this point; but when occasion calls, we think it a duty to publish boldly our own convictions whether they agree or not with the fancies of others. We are always mortified when we see in any of our farming papers fanciful modes of farming recommended, because they impede the progress of improvement,—they serve to create a general prejudice against looking into a paper for any thing valuable on the subject of farming—and we must honestly acknowledge that the strong prejudice in the minds of many of our yeomanry against what they have denominated "book farming," is not without foundation.

If any farmer wishes to try the new mode of drying hay we hope he will try it on a small scale at first, and for the main body of his hay let him endure the old fashion for one year more of curing it in the sun. Those who dry it in heaps, we would inform him, generally pitch about half a hundred together in the fore part of the same day on which it is mowed—this is turned over towards evening—then again next day once or twice and—*when the weather is fair*—the book says let it remain out four or five days. When the weather is not likely to prove fair some make large heaps of the small ones—some let the small ones stand and take their chance until fair weather comes again.

Our mode of making hay.

We have seen various modes tried, but we

have never found any that are better than the following: Mow the grass in the forenoon or towards evening—let it be well spread to the sun—rake it together in the afternoon and put it in cocks if the weather is not promising—or when the harvest is great and the hay is not dry enough to be raked it should be turned green side up before the dew has copiously fallen—on the next day this should all be spread out on the sun, and two days of good weather will generally fit the hay for the barn. When the burthen is quite heavy or when the grass is very green we give it more than two days' sunning—but frequent stirring makes a vast difference in the time necessary to cure hay—the oftener it is moved the sooner it will become dry.

An experienced hand will judge intuitively, almost, when hay is fit for the scaffold—some wring a handful to see if any moisture is left in it—but as a general rule English hay must have two days' sunning, unless we cut it so late that it has become half dry while standing. If we suspect our hay is not quite dry enough, but do not wish to risk it out longer, we may often save it by throwing it on a scaffold or a bay, and not suffer it to be trodden down for a few days—and one peck of salt on a ton often saves us the labor of another day's opening and tending.

If we have but little hay, and wish it cured in the nicest manner, we are careful to put it in cocks while warm and before the dew falls—on the next day we find it has been drying since we packed it up, and, on opening, it presents a fine appearance—but when we have large quantities on hand, we cannot always be so particular—we suffer it to lie in winrow when the weather is good, and thus save the labor of packing and of opening again.

THE CHINCH BUG.

From the Carolina Planter.

Mr. Editor:—Having suffered seriously by the ravages of the chinch bug for the last three years, I have observed its habits, its mode of attack upon corn and small grain, and will endeavor to give you the result of my experience, for the benefit of those planters whose farms are but recently visited by this most destructive insect.

Generally, the bug does little injury in the early part of the spring, being engaged in the business of propagation. They deposit their eggs in large numbers, most frequently under the bottom blade of the corn, and sometimes under the second and third blade. The young insect is very small, and is known by its red color. In a short time after the egg is deposited, the young may be seen by pulling the blade downward, lodged in a compact circle around the stalk—they are very delicate at this stage of their existence, and I was satisfied by an experiment made last summer, that millions of them were killed by stripping the blade off, and exposing them to the sun—a process which is attended by no perceptible injury to the growth of the corn, inasmuch as the bottom blades, being generally more or less injured by the plough, and from their proximity to the roots are of comparatively little use in receiving nourishment from the atmosphere. The most certain mode of destroying the young insects is by the hand—a single gripe, accompanied by a horizontal motion of the hand

being sufficient to destroy the whole depositive. This labor may be performed in the same time that would be employed in thinning the corn; and when the importance of the result is compared with the means used in attaining it, I think no one can doubt, even admitting the time necessary to perform the labor twice as long as that supposed, that "the end will justify the means."

The young insects do the principal mischief, by beginning to suck the juices of the corn where they are deposited—and as their powers of locomotion and their appetites increase, by attacking and finally killing the whole stalk.

Every other mode of destroying this voracious insect that I have known to be resorted to has proved abortive, or "the remedy has been worse than the disease." And after all, the only permanent consolation which I can offer to the suffering planters of your section, is to be found in the migratory habits of the chinch bug. In the particular neighborhood where I plant, they have committed most distressing ravages for the last three years; and this, the fourth year, since their first appearance, they are doing comparatively no injury, whilst the adjoining districts, north and west of us, which have been heretofore exempt, are now suffering greatly.

I have known no remedy to be tried, and have heard none suggested, to prevent the ravages of the chinch bug upon small grain.

J. T.

Edgefield C. H., June 10, 1840.

INDIAN COTTON.

From the Agriculturist.

The American Farmer and Natchez Free Trader bring us some interesting remarks in relation to the prospects of the cotton culture in India. Mr. Boyles, commissioned from the British government, has lately visited Louisiana and Mississippi for the purposes of being initiated into all the secrets of cultivating, gathering, ginning and preparing cotton for market. From the last accounts he had engaged the services of eight young gentlemen of Adams and Jefferson counties, Mississippi, and one from Louisiana, who are all practically acquainted with the different varieties, as well as the modes of cotton culture, to accompany him to Surat, for the purpose of introducing this staple and specie bringing production on a distant shore. They have been engaged at a salary of twelve hundred pounds, and will shortly leave for New York, and thence across the deep to the far east. They take with them nine gin stands, models for gin houses, presses, running gear, and all the fixtures of such establishments. The English, feeling so much interest in this new undertaking, have already appropriated twelve thousand pounds for its encouragement, and evince a determination that the project shall not fail, if money and men can make it successful. Some experiments have been made, with as good success as could have been anticipated, taking into view the sparse information, and of course, slovenly mode of cultivation with the natives. They have worked without cotton gins and the necessary implements for a cotton field, and still the success, in the midst of embarrassments, has been so great that a bold effort is

making for its extensive culture. As some proof that the undertaking will be successful, we remark that from all the information we have of the country, the climate is well adapted to the growth of cotton. Though Surat is further south—(being a little over 20 degrees N. latitude,) than our best cotton regions, yet from the trials made, we would suppose as good cotton can be raised there as in latitude 30 degrees of the United States. There is, however, a vast region of country the most fertile of earth between the Ganges and Himalah mountains, running northward to Cashmere, that will evidently grow cotton as fine as any place of the world. In China, India and China proper, cotton has long been produced in great perfection; and we see no good reason why a section of country might not be selected on the eastern continent, many times larger than the cotton planting regions of North America, where this staple product might not do as well as on any portion of the earth.

The soils of India have been analyzed and compared with the soils of Louisiana and Mississippi, and found to contain about the same materials, and very much resemble in texture. Another inducement to embark in producing cotton in India is, that the labor of the natives can be had at one fifth, or one fourth at most of what it will cost in Louisiana and Mississippi. Two dollars per month is supposed to be about the average price per hand, but in the cotton districts of America from ten to fifteen dollars per month, is the price of dull "cotton patch" negroes. Still another thing not to be forgotten is, that the *right men* have taken hold of this business. The English have wealth, intelligence, enterprise and the untiring perseverance that generally carries them through triumphantly. After having placed these facts before the American reader, we ask, in the event the English are successful in producing cotton in the east, what effect will it have upon the cotton growing of the south? We answer, it will materially injure it, if not quite destroy it. All, or very nearly all the cotton we export for the consumption of European manufactories, will no longer be needed, for perhaps a better and certainly an article at less cost can be produced in India. True, it may be the interest of Britain to exchange her surpluses, not so much needed or consumed elsewhere for a small portion of our cotton; but the argument that southern planters will ultimately be compelled to turn their attention to other pursuits than that of cotton, is very reasonable. We suggested, as southerners are generally very fond of silk, that they commence the silk business. The climate of Georgia, Alabama, Mississippi and Louisiana, is equal we suppose to any, and we should be pleased to hear of experiments being made through the whole south.

REMARKS ON CALCAREOUS EARTHS AND SOILS.

From the Southern Cabinet.

Mr. Editor,—I observe that Mr. Ruffin has republished in the May number of his *Farmers' Register*, [p. 301] the article on Calcareous Manures, written by me for your April number. I am sorry that he should consider any part of that article "personal." I wished only to point out, what I considered an "error" in his statement, that the

richest lands in the United States contained little or no "calcareous earth,"—to lament that this, if considered alone, should excite doubts of the important truth that calcareous earth greatly promotes the fertility of soils, if not essentially necessary to such fertility—and to suggest a mode of explaining the apparent inconsistency. If the richest lands in the United States contain no calcareous earth, then such earth is not essential to fertility;—does it really promote fertility in any land?

I believe that Mr. Ruffin is in an error, and that from his not being sufficiently acquainted with chemistry, he had not carried the analysis of these rich lands far enough, or he would probably have discovered in them sulphate of lime (plaster of Paris), or oxalate of lime, or both. Neither of these calcareous earths can be discovered in the usual way of analyzing soils, yet they are believed to be among the most powerful of calcareous manures, and very likely to be formed in our soils by the natural decomposition of some substances, and the subsequent combination of the oxalic and sulphuric acids with lime in these soils. I meant only to explain away a doubt or difficulty, in a way that I had not seen it explained by any one else, and thereby to encourage all who doubted, to go and try the calcareous earths on their lands. We are all liable to errors as well as Mr. Ruffin; it is only surprising that but one error can be suggested against him, and that, evidently the result of his not having gone far enough in the analysis of these rich lands. In this opinion, I myself may be in an error, and some third person may be found, to correct us both in our premature conclusions.

Doubts have been intimated by others, besides Mr. Ruffin, as to the general existence of so large a proportion of magnesia in the calcareous earths of South-Carolina. I will state my mode of procedure, and let others repeat it, either to confirm or disprove the result. Having dried the calcareous matter, I weigh one hundred grains of it in powder and dissolve it in diluted muriatic acid. When the effervescence has subsided, I decant the clear solution and wash the earthy residue so as to separate all that is soluble about it. These washings are added to the clear solution, and the earth dried. I generally guess from its appearance when dry, as to the proportions of clay and sand. I then try the solution with blue paper, and if it contain an excess of acid, I neutralize that with a solution of potash. I then pour into it a solution of oxalic acid, until it is a little in excess, and stir the mixture for a few minutes, to promote the union of this acid with the lime previously united with muriatic acid in solution. The oxalate of lime thus precipitated is washed, dried on filtering paper, and weighed. I generally set down one half of this weight as the proportion of lime found in it. The residue of the solution I precipitate with potash, and obtain the carbonate of magnesia which subsides, and is then washed, filtered, dried and weighed. I may not have mixed a sufficiency of the oxalic acid to precipitate the whole of the lime, and in that way some of it may have been mixed with the magnesia, so as to give too great a proportion of the latter. All the books speak of magnesia as generally found in lime stones, and I have no doubt of the fact in these cases.

The chief cause of misunderstanding between

Mr. Ruffin and myself, is, the precarious meaning of the terms used. He prefers the term calcareous earth, thereby meaning carbonate of lime, as I have since learned by reference to his book. I read that book about three years ago, but did not recollect his meaning as there explained. I supposed calcareous earth to mean "lime" in every form and combination in which it is found in the earth. I submit to the candor of your readers, and of Mr. Ruffin, whether I am not excusable for the mistake, as I had not his explanation before me. I bought the first edition of his work three years ago, and did not know until now that there was a second edition. Let me request, through you, that he would send on some of them for sale in Charleston, as there are none to be found in the book-stores or libraries. Jos. JOHNSON.

It is but justice to Dr. Johnson to republish his rejoinder, as above. The admission of error made therein, as to a supposed position of the author of the 'Essay on Calcareous Manures,' is amply sufficient, and he has no desire to contest any other question raised. He never assumed that his reported examinations of soils, to ascertain the contents, or absence, of *carbonate of lime* only, were otherwise than partial, and limited to that one substance; in regard to which, however, he claims to have been accurate. As to his particular application of the term "calcareous earth," as made throughout the essay, he stated at length the difficulty attending it, and still more of every preceding author's different definition or application of that term; and gave his reasons for limiting it to the *carbonate of lime*. (Appendix, p. 72.) And these several applications were not only in the second edition, to which we referred, but in the first also.

In using the expression, "as to matters personal"—we did not mean, as Dr. Johnson supposes, that we deemed them *personally offensive*, but literally and simply as relating to the author personally. In striking the balance between the remarks of Dr. Johnson in approval and in censure of the work, we thought then, as now, that the former preponderated.

We meant not to "intimate doubts," as to the remarkable and general abundance of carbonate of magnesia discovered by Dr. Johnson in the marls of South Carolina. But the fact is so remarkable, and may be fraught with such important consequences in the use of the manure, that it certainly, as we said, "requires attention and full investigation" before admitting its certainty; and that investigation we hope that Dr. Johnson will give. We have seen, and analyzed, a specimen of one bed only of magnesian marl found in Virginia; and that, with all the specimens of marl from South Carolina which we have seen agreed in the one respect, of seeming rather a soft rock of homogeneous texture, and not a mixture of fossil shells and sand like what are called marls

in lower Virginia. We did not suspect the presence of magnesia in the Carolinian marls, and therefore did not test its presence separately from the lime; but we suspect now, from Dr. Johnson's report, that part of the earthy carbonate in these specimens, which we considered and estimated as lime, was in fact magnesia.

We have no reason for distrusting the accuracy of Dr. Johnson's process for separating magnesia from lime, not having tried it. But we can refer him, for comparison, to two other modes, used by different operators in analyzing the magnesian marl of Virginia above referred to, and which may be both supposed correct, from the close agreement of results. These are at pages 425 and 462, vol. i. of Farmers' Register, which articles we shall send to him, to aid his investigation of a subject so important to his country.

In answer to the request contained in the last sentence of the foregoing article, we repeat that we never send any publications to booksellers for sale, but will furnish through the mail any that may be desired to be purchased. We shall now send a dozen copies of the 'Essay' to Dr. Johnson, as presents for himself and any of his friends to whom the work may in his opinion be beneficial. —ED. F. R.

PROFITS OF SHEEP AND OTHER GOOD NOTIONS.

From the Franklin Farmer.

Washington, Aug. 21, 1827.

You ask me how I have succeeded with my sheep? I have never despaired that sheep would, sooner or later, become an object of importance. But the market for wool has been too fluctuating and uncertain to justify going largely into the raising of sheep. I have, heretofore, endeavored by selling, killing off, &c., to keep my flock within moderate bounds. I sheared last spring, two hundred and thirty-six, of all grades from three-fourths to full-blooded—only three or four of the latter—the wool of which, washed on the sheep's back, averaged me thirty-six cents per pound. I have bred for a number of years from common ewes (at the beginning) and full-blooded rams. My sheep last spring averaged 3 pounds and twenty-six hundredths of a pound net wool, per fleece—about half ewes and half weathers—and produced one dollar and seventeen cents per head. Even at this price, sheep are much more profitable than cattle; as, upon the same quantity of land and with less labor, you can raise twelve times as many sheep as you can of cattle. Steers at five years old, even stall fed and finely kept, will not average more than twenty dollars, perhaps not so much; but 12 sheep, in five years, (if as fine as my flock) will produce seventy dollars and twenty cents, without counting any thing for the increase of the flock, or the value of the mutton, tallow, skins, &c. of those killed off. This estimate is

founded upon my actual sales last spring. If the increase of the twelve sheep (say six wethers and six ewes) including the value of those killed in five years, should be worth twenty-nine dollars and eighty cents (about two dollars and fifty cents annually) the whole proceeds would be one hundred dollars and 20 annually. Now what stock of cattle would be required to produce annually the same amount, if kept solely for the purpose of beef? Say one cow and calf, one yearling, one two year old, one three year old, one four year old, and one five year old, the cattle to be sold off in the fall after five years old. Thus to be enabled to sell annually one steer or spayed heifer, you must constantly keep on hand six head of cattle, and this upon the supposition that the cow produces a calf annually, and that no casualties happen. To keep up the stock, however, and to allow for casualties, you cannot calculate upon selling more than one for every seven, especially as you would have to encounter the risk of spaying the females. To be enabled to sell ten beeves annually at twenty dollars each, amounting to two hundred dollars, you must keep up a stock of at least seventy head of cattle. But sixty ewes and sixty wethers (allowing for the increase as above) will produce you the same sum; or one hundred and seventy-one sheep will produce that amount, without allowing any thing for the increase. But if you could only keep ten times as many sheep as you can cattle, upon the same quantity of land, and with the same labor, then you could as easily keep seven hundred sheep as seventy cattle. Seven hundred sheep (supposing them as fine as mine,) would produce annually eight hundred and nineteen dollars, without allowing any thing for the increase; and allowing the increase, upwards of one thousand dollars, whilst the seventy head of cattle would produce you annually only two hundred dollars. In my judgment, then, sheep are a much better stock than cattle. Indeed, I am clearly of opinion that (except a few for butter and milk, and to feed the rough provender that every farm produces) beef cattle are the most unprofitable stock that can be raised. Indeed, I have found, even to this extent, the raising of cattle is so poor a business, at the present prices of beef, that it is better to let my straw lay and rot, for manure, than to raise cattle to feed it away, because of the quantity of pasture they consume, which might be more profitably fed to other stock. Entertaining these views, you will readily suppose I do not hold cattle raising in much estimation.

Wool will bear transportation to a distant market much better than any agricultural production of our state. It is well adapted to all the states that do not grow cotton. Were we to manufacture all our cloths, blankets and other woollens, and to exclude foreign wool by a gradual prohibitory duty; there would, in a few years, be an increased demand, and consequently an increased production of wool to the amount of at least five millions of dollars annually, and the labor bestowed in manufacturing this wool would be a creation of wealth to the amount annually of seven or eight millions more, besides the immense advantages that would result to the various mechanics in putting up and repairing buildings, making and repairing machinery, &c. &c., and to the farmers by the home market, furnished

for their agricultural productions. Language can hardly convey an adequate idea of the prosperity to which such a state of things would give rise. All this prosperity is within our reach, if we have but the wisdom to avail ourselves of the advantages that offer. Time alone will determine whether we are to become the most prosperous nation on earth, or to continue laboring under the depression and difficulties to which we shall ever be exposed, while we depend upon a foreign nation to manufacture for us the necessaries of comfortable sustenance, while she refuses to buy from us a pound of our flour, beef or pork.

Yours, very respectfully,

A. BEATTY.

Prospect Hill, Feb. 8th, 1840.

I have no objection to your publishing the letter I addressed to Mr. L. Sanders in August, 1827, if you should deem it expedient to do so. Considerable changes have taken place since that period. The price of cattle, since that time, has considerably increased, I believe almost doubled, whilst wool of the same quality has declined in price. In 1827, *three-fourths* blooded wool sold for 36 cents; last year, I sold my crop in Mayaville, (full-blood) to a wool dealer for 40 cents per pound, which, for the grade, is lower than in 1827. My wool would, however, have probably netted me 45 cents in Philadelphia, clear of all charges, and that perhaps, may be considered as the price which full-blooded Merino wool will net the Kentucky wool grower, at this time, after deducting charges for transportation, commission, &c., which amounts to about three cts. per pound. My fleeces (washed on the sheep's back) averaged about three pounds. Each fleece will, therefore, produce one dollar and thirty-five cents. In consequence of the uncertainty of the wool business, arising from our unsteady policy, in relation to the *encouragement and protection of home industry*, I have kept down my flock to about the number I owned at the date of my letter to Mr. Sanders. I have now two hundred and sixty. The wool of these at the above rate, would amount to \$350. To this sum should be added the value of the annual increase, over and under age is of far greater importance than the above keeping up the flock. I would estimate this at only forty-nine dollars. The product of my sheep would, therefore, be four hundred dollars annually.

In comparing sheep husbandry with cattle raising, a distinction should be made between the rearing of cattle, and grazing and feeding them. The grazier buys his cattle at the suitable age for grazing and bringing them into market in one year. If he manages his business judiciously, he will by at such a rate as will make his cattle, when grazed and fattened, pay for the pasture and corn consumed by them, and produce a fair profit upon his investment of capital, and labor expended in feeding his stock. This is a business that requires a large capital in land, negroes, farming implements, &c., besides a considerable sum in money to buy cattle. It is, doubtless, a good business for the rich interior of our state, as it affords a ready consumption for the rich blue-grass pastures, and abundant corn crops of that region of country, and greatly contributes towards the fertility of the soil. I am not sufficiently conversant with the grazing business to draw a com-

parison between it and sheep husbandry; and it was not my intention to do so, in the letter I addressed to Mr. Sanders. Nor did I intend to speak of the profits of rearing blooded cattle to sell for breeders. This is a business that must necessarily be confined to a comparatively small number of farmers, and its profits are too uncertain to be susceptible of any very accurate estimate. My letter then must be considered as having reference purely to the rearing of cattle for beef, milk and butter.

You will discover from my letter, that I was but little inclined, at its date, to engage in the business of cattle raising. I never have suffered my stock of cattle, since that period, to increase beyond twenty-five or thirty. I have aimed to keep them as near the former number as practicable, so as to make them, compared with my sheep, as about one to ten. Thus my cattle stock is annually about as follows: eight milch cows, four each of yearlings, two years old, three years old, four years old, and one bull. This makes 25. As four of these are killed or sold in the fall after they are four years old, their places are supplied by four spring calves, by which the number is kept up. The balance of my calves are either vealed, or sold at weaning time. Thus my cattle stock, (if sold when grass fed, the fall after four years old) will produce me, (sold to our neighboring brethren) about one hundred dollars. If I add for the four supernumerary calves twenty dollars, I then have one hundred and twenty dollars for the produce of my cattle annually; supposing no deaths by casualties. A deduction of twenty dollars on that score would perhaps not be too much, which would leave only one hundred dollars for profit. To this, however, must be added the value of the milk and butter, from the eight cows, the value of which I cannot well estimate in money. If we add one hundred dollars more on that account we shall have, as the entire product of my cattle stock, two hundred dollars, just half the annual value of my sheep. Now as to the comparative cost of keeping the two descriptions of stock, I have no hesitation in saying, that the cost and trouble of keeping my two hundred and sixty sheep is less than that of my twenty-five head of cattle. The sheep require no corn; and except when the ground is covered with snow, will subsist better upon grass and rye pasture than any thing you can give them; and require no labor of feeding, except for the very small portion of the winter that the ground is covered with snow. When that is the case they require a little hay or corn fodder. It is necessary, however, that they should have a good range of blue-grass pasture, upon which, though very short, they will do better than upon dry food.

My cattle stock require to be fed between three and four months, and the milch cows must be grain fed at least until we adopt the root culture.

There is one difficulty to be encountered, in sheep husbandry, which I have not yet mentioned. Dogs are occasionally very destructive to our flocks. Perhaps I ought not to consider this a very great disadvantage, as they have aided in keeping down my flock to a number that I do not wish to exceed, while there is so much uncertainty as to the period when we shall be deprived altogether of a market for fine wool. I have looked forward to that period, ever since the passage of

the Compromise Act. If our woollen manufactures shall be enabled to withstand the shock they will meet with, when that act goes fully into operation, I shall be most agreeably disappointed. I feared, from the moment of its passage, that they were destined to be completely *prostrated*. I believe that such will be found to be the result, when that act goes fully into effect. When it passed, woollens, you will recollect, paid a duty of fifty per cent. The reduction of duty commenced, I think, (I speak from memory) in June 1837, and was only three per cent. per annum (that is one tenth of the excess above twenty per cent.) for the years 1837, 1838, 1839, and 1840, making the whole reduction for the four years twelve per cent. But in 1841 and 1842 the reduction will be six tenths of the excess, thereby bringing down the duty very suddenly from 38 per cent. to 20 per cent. When this period arrives, *only a small effort of English woollen manufacturers* will be necessary to break down our own woollen establishments completely, and then they will have full command of the market for woollen fabrics in the United States, which will greatly more than indemnify them for any temporary sacrifices, they may have made to put down their American rivals. We shall then have the *glorious privilege* of relying altogether upon *foreigners* to grow wool for us, and to fabricate our blankets, cloths and other woollen goods. We shall too, frequently, have the *glorious effect* of importations, largely exceeding our exports, which we are now *so deliciously* enjoying. To be serious, our "free system" of convenience, with which we are now so much in love, is to break down nearly all our domestic establishments, (perhaps coarse cottons may survive.) Even our navigation, after having grown into an importance, next to that of England, is destined to go with every other interest. The West India trade was wrested from us, by superior British diplomacy, aided by the folly of a political party, who desired to make political capital, by bartering away our navigation rights. Next our navigation interest must go.

Behold the results of our system, in a table annexed to the speech of Mr. Davis, of the senate, on the sub-Treasury bill. In 1821, the tonnage of British vessels, entering our ports, was 55,188. In 1835, it had increased to 529,922. The increase between these periods was *right hundred and sixty per cent.* The increase of our tonnage, during the same period, was *seventy-seven per cent.* Thus, in fifteen years, British shipping increased more than *eleven times* as fast as ours. In 1821, British shipping entering our ports, was to ours about as *one to fourteen*. In 1835, nearly as *one to two and a half*. In a few years more we shall have the glory of seeing more British than American ships arriving in our ports. And if we are to continue our glorious system of admitting foreigners to enter into free competition with us in every thing, it will not be long before our noble tars will be compelled to abandon the ocean, and betake themselves to the land for a support, instead of having "their home upon the deep." It would be in vain to attempt to reason upon the subject of the tariff, in the present state of the public mind. The opinions of a single individual have had such a powerful influence, as to overturn the most settled convictions of a whole community; and nothing but *time and long and severe suffering* can

bring back the public mind to a sound and wholesome state, in relation to the *importance and absolute necessity* of giving *protection* to our *agriculture, manufactures, commerce and navigation*, the four great pillars of our prosperity. We shall have to endure a long course of suffering before we shall be brought to think *correctly*, and to act *rightly* and *efficiently* upon the important topics you touched upon in your letter, and to which I have replied in a hasty and, I fear, too desultory a manner.

It would be doing injustice to Mr. Clay to quit this subject without saying, that not the slightest censure is intended to be cast upon him for the part he had in relation to the Compromise Act. On the contrary, I believe, that under the circumstances, he could have done nothing better for the manufactories or the country. The question was whether the whole system of protection should at once be overthrown, or such a measure be adopted as the compromise bill. The latter alternative was certainly best, because it gave time for a breathing spell, and to prepare for *the worst*. It afforded time also "for the second thoughts of the people." We shall soon see whether they will use the opportunity to any profitable purpose.

Yours, truly and sincerely, A. BEATTY.

HOING RUTA BAGA.

From the New Genesee Farmer.

An inexperienced cultivator of the ruta baga may commonly be known by his leaving the plants about four times as thickly together as they ought to stand. On ground of any tolerable degree of fertility, the distance of one foot at least should be allowed between the roots, except they be in drills three feet asunder, when they may be suffered to stand a little nearer. If sown broadcast, eighteen inches square should be allowed to each root. If the land is rich enough, they will be so much larger in consequence of this increased space, as considerable to increase the amount of the crop, and greatly to diminish the labor of harvesting.

We have observed, on the best soil, well manured previous years, where the crop had been sowed broadcast, and two feet square allotted to each plant, roots weighing from ten to fifteen pounds, and yielding about fifteen hundred bushels an acre.

If the soil be poor, the above remarks will not of course apply, and the roots must be much nearer together, as they cannot be made to grow large, and number must be made to compensate, in a small degree though it be, for a want of magnitude.

SUNFLOWER SEED OIL.

From the New Genesee Farmer.

Messrs. Editors—Wm. Wood, an oil manufacturer here, has made 27 gallons of good oil from 19 bushels of sunflower seed, without hulling, with Williams & Pinder's hydraulic press. He also made 2½ gallons of oil from 2½ bushels of common pumpkin seed.

The above was manufactured in the usual way of managing flax seed, except that the crushed seed was not subject to as much heat in the revolving cylinder, before it was pressed. S. W.

Waterloo, June 15, 1840.

THE STRIPED BUG.

From the New Genesee Farmer.

Every person who cultivates cucumbers and melons must be acquainted with the yellow striped bug. In former years, we depended most on our activity in catching them, chiefly in the cool of the morning and evening; but we have an easier way to manage them. In the hottest weather they are the most active and seemingly the most voracious; and some days ago, when the mercury stood at 80°, aware of this danger, we visited the cucumbers, and found the bugs in great numbers. A sprinkling of quick lime however, scattered them in haste; and we have not seen a dozen since in the whole garden.

But the large brown bug that infests squashes and pumpkins, must be treated differently, and nothing is better than decapitation. †

BEES.

From the Cultivator.

Few insects, or animals, furnish more materials for instruction or reflection than the honey bee; their wonderful instincts, their labors, their social regulations, are alike deserving the study and notice of all; and while their labors contribute so much to the comfort of man, they should receive a proportion of his care and attention. The blind Huber was the first to give mankind a history of the bee, its habits and instincts, worthy of the subject; and, although many entomologists have since devoted much time to this matter, it is surprising how few facts they have added to those accumulated by the patient and persevering labors of the blind observer. In the management of this domesticated insect, in the best mode of availing ourselves of its stores without taking its life, and in the protection of it from its numerous enemies, some advances have been made, and to no individual are the public more indebted on this score, than to Mr. Weeks, of Vermont, whose Manual on the management of the bee, is deserving of great praise for the intimate acquaintance shown with the subject on which he treats, and the great amount of practical information he has condensed into a very small compass. It is a book that should be in the possession of every bee owner, as they can scarcely fail of receiving much valuable instruction from its pages, even should they not be in possession of the hive he has invented, which experience shows to be admirably adapted to aiding in the management of the bee, and to which, as a matter of course, many of his remarks and rules have reference.

There are two methods adopted in keeping bees—one, in either the common or the improved hives, when they multiply by swarming; and the other, when one or more swarms are put into a house or chamber, so large that their labors can be continued for years without swarming. Both methods have their advantages and their disadvantages. Small hives are more liable to be attacked and destroyed by moths, or to be robbed, than very large ones in which there are abundance of bees; but they multiply more rapidly, and starting with a given quantity of bees, will, in a term of years, if safe from accident, produce a

greater quantity of honey; at least, some experiments seem to show that is the case; while bees in houses or large hives require less care, as they rarely swarm, and the honey can be taken when wanted without destroying the bee. This objection of destroying the bee, is obviated in Mr. Weeks' hive, as well as in some other of the improved or patented ones.

Every one who keeps bees should have his hives in readiness, before the time of swarming arrives. They should be made of good stuff, well seasoned and jointed, planed and made carefully, so that the moth may find no cracks in which to deposit its eggs, or the young grub to hide. Hives must always be kept clean and sweet, and if so, a hive that has been used, is as good as one in which no bees have ever been. The hive should be ready for the swarm, as, if one is not offered them soon after coming out and alighting, an embassy is sent out to find one, and the result is, the swarm is lost.

It is still the custom with many, while the bees are swarming, and before they alight, to make all sorts of noises, with horns, tin-pans, bells, &c.; but this is wholly useless, and only serves to irritate the bees. When, after once lighting, they have again risen to go away, we have seen a few pails of water, thrown among them, appear to produce a good effect, caused probably by the wetting of the queen bee's wings, and compelling her to retreat from the apparent shower. In most cases, however, when the bees show a disposition to go off, they will generally do it sooner or later. We have known them to leave a good, new hive for the woods, after they had formed several considerable pieces of comb, and been apparently contentedly at work for thirty hours. There is usually very little danger in taking care of bees while swarming, as the workers invariably leave loaded with wax and honey for the preparation of their new home, and are consequently little disposed to be pugnacious.

Many apianians are very careful to regulate the size of their swarms of bees, by putting two or more small, weak swarms into one hive, especially when such come out late in the season. Mr. Weeks says—

"Second swarms are generally about half as large as the first, and the third swarms half as large as the second ones. Now, if second swarms are doubled, so as to make them equal in numbers with the first, the owner avails himself of the advantage of a strong colony, which will not be likely to be disheartened for the want of numbers, nor overcome by robbers from stronger colonies."

He might have added, that by more fully covering the combs, these are better protected from the moths where the bees are numerous, than in weak swarms. In regard to doubling swarms, Mr. Weeks adds—

"The operation should be performed within two or three days, [after swarming,] at the farthest four days. The sooner it is done the better and the less hazardous the experiment. As a general rule, second swarms only should be doubled. Third and fourth swarms should have their queens taken from them, and the bees returned to the parent stock.

The most formidable enemy the bee owner has to encounter, is found in the bee moth; and these if they once obtain a lodgment in the hive, and

deposits their eggs in safety, in the comb, or in the glutinous matter with which the bees line their hives, they are expelled with difficulty, and the destruction of the bees is the common result. The egg of the moth or miller produces a small grub or worm, which burrows in the comb, or lining of the hive, for a time, or secretes itself in crevices of the hive, so that the bees cannot get at them, to remove them or destroy them in the hive. As the grub increases in size, it spins a cocoon or web, which it enlarges as it proceeds in the work of eating the honey and comb, and which protects it from the attacks of the bees. Where there are many bees in a hive, the miller finds it difficult to make a lodgment, and if the eggs are deposited, it is hardly possible for the young grub to escape their vigilance; but a weak hive, will, in such a case, scarcely fail of being lost to the owner. A great variety of methods have been practised and recommended, to prevent the attacks of the moth. It was at one time supposed that hives placed in the chambers of elevated buildings, would be above their reach; but some instances have occurred in which hives in the garrets of three story stores have been destroyed; and besides, every bee hunter knows it is not uncommon to find the moth or the grub in the most elevated trees in which the bee is found. Dr. Thatcher, a few years since, announced as an infallible preventive, placing the hive in the bee house, on a layer of sweet clean mould or sand, as the miller would not deposit its eggs in such a position. Mr. Weeks, however, as well as others, found that where the moth was numerous, this method afforded no security, as, after standing a few days, the earth under the hive was found full of grubs, which found in it a safe retreat from the bee. As it is found that the moth usually deposits its eggs under the margin of the hive, it is also found that placing the hive on small square blocks at each corner, so as to raise it half an inch from the board, and thus enable the bees to keep the exposed portion clean, is one of the best preventives known. Frequently sprinkling a little fine salt under the margin of the hive, renders the place untenable to the grub, and is not displeasing to the bees. A gentleman of our acquaintance, who has been very successful in his management of bees, uses a preparation of spirits of turpentine, oil of spike, &c. to keep the moth from the hive. These substances are mixed, put in a saucer, over which a piece of muslin is securely tied, to prevent the bees from getting into it; and this is placed under the hive during the time that the moths are the most active. He assures us he has not lost a swarm from the moths, during the time he has used this preparation. We believe those who have adopted the Vermont hive, have found little inconvenience from the moth, and think it probable, that, with such a hive, and frequent examination, (which is indeed necessary with any hive,) bees may, in most cases, be preserved in safety.

When bees are kept in improved hives, or in a common house or chamber, the honey may be removed at pleasure, without interfering with their labors, or causing that irritation which, if repeated, will render bees cross and dangerous. Much more honey will be made in a hive, from which it can be removed when filled, than in an ordinary hive, as the instinct of bees impels them to desert from labor, only where there is no space to store

its fruits. When a hive is filled, they only provide their daily supply; if part of the honey is removed labor is immediately recommenced to replace the quantity abstracted. But, unless there is an abundant supply for the wintering of the bees, none should be taken from the hive late in the season, as starvation and the loss of the whole stock may be the result.

It is sometimes necessary, in unfavorable seasons, or when swarms are late, to feed them to prevent the death of the bees, and the experience of many apirians would go to prove, that the most proper time for this is during the warm days that occur in the fall, before the commencement of continued cold weather. If the weight of the hive and bees is known, and both should always be ascertained, there is no difficulty, when the season of making honey is closed, in determining, by again weighing, the quantity of honey made, and consequently whether feeding will be required. In feeding, honey in the comb, or strained honey, may be used; but if the last, a thin board pierced with numerous holes, must be laid on the surface of the honey, through which they can obtain the food, or many will get in the honey, and be lost. Unless bees are nearly destitute of honey, it is bad policy to feed them in the spring, as they fill up the combs that should be occupied by the young bees. From twenty to twenty-five pounds of honey will be required, to carry a swarm of bees from November to the middle of April, or the time when they can recruit their stores. Where honey cannot be had, sugar dissolved, or molasses, may be substituted; but honey is always to be preferred where it can be obtained, as all other kinds of food are more or less apt to induce disease.

There is a very great difference in the qualities of honey made in different places, owing to the nature of the flowers from which it is principally extracted. The honey of a considerable district on the southeast shore of the Black Sea in Asia Minor, is noted for its intoxicating or rather mad-denning qualities, when new; qualities supposed to be owing to a species of hypericum, which abounds in that region. Bees always extract more or less of the peculiar matter of plants with the honey, and hence new honey is more liable in all cases to induce disease, than that which is old. It is the opinion of many that honey is always pure, no matter from what source it is derived; but this is altogether a mistake. Mr. Weeks says—

"Bees never make honey, but extract it from such flowers, and other substances as yield it, without producing any change from its original state. Good honey is principally taken from white clover, orchards, sugar maple, bass or linden, and other forest trees, while in blossom. Poor honey is extracted from buckwheat, and low land flowers; hence, those who would save their good honey unadulterated by that which is poor, will remove it before the latter can be extracted.

Various modes have been tried of wintering bees; all of which, perhaps, have been more or less successful. The dangers to be guarded against are principally those of starvation, extreme or long continued cold, and too much moisture or dampness. The first can be prevented by proper attention to late or early feeding. Death from freezing more rarely occurs, but almost every apiarian, in high northern latitudes, must have lost bees from this cause. Extreme cold also produces death from

suffocation; by freezing the breath or vapor of the bees, and so effectually closing all the openings of the hive by ice, that the air becomes incapable of supporting respiration, and death is the inevitable result. Where too much moisture exists, the combs become mouldy, and the bees become diseased and unhealthy, and frequently perish. If cold weather continues for any great length of time, the hives should be examined, and if the bees are likely to die, they must be at once removed to a room of a moderate temperature, and where the animal heat can be gradually restored. Some apiarists are in the habit of burying their bees late in the fall, and allowing them to remain in that condition until the spring is so far advanced, that they can gather honey from the early flowers for themselves. Their argument is, that, as bees during their torpid or inactive state do not consume honey, by prolonging this state, the danger of starvation is avoided, death from freezing cannot take place, and if the earth is dry, the combs will not mould so as to produce injury. Mr. Weeks says—

"A cellar made in the side of a dry hill, so covered as to keep out water, is a good storage for wintering bees. There should be two ventilators at the two most extreme parts of the cellar—one near the bottom and on its side to admit pure air—the other through the top or covering to allow the bad air to escape."

Want of air is the most frequent cause of death to bees, and this danger of suffocation requires to be more carefully guarded against than any other. Dryness is indispensable to health; and it should always be remembered, that any extra care which bees may receive, which is necessary to their safety or comfort, is usually amply repaid by the additional quantity and quality of the honey produced.

FORMATION OF THE LAGOON ISLANDS.

From the London Quarterly Review—Voyages of the Adventure and Beagle.

Almost every voyager has been struck with astonishment at the lagoon islands—rings of land rising out of the depths of great oceans, and of which a good idea may be formed from the characteristic sketch of Whitsunday Island in Beechey's voyage. These are admirably described by Mr. Darwin.

"The annular reef of this lagoon island [Keeling] is surmounted in the greater part of its length by linear islets. On the northern side there is an opening, through which vessels reach the anchorage. On entering the scene was very curious and rather pretty: its beauty, however, being solely dependent on the brilliancy of the surrounding colors. The shallow, still and clear water of the lagoon, resting in its greater part on white sand, is, when illuminated by a vertical sun, of a most vivid green. This brilliant expanse, several miles in width, is on all sides divided, either from the dark heaving water of the ocean by a line of snow-white breakers, or from the blue vault of heaven by the strips of land, crowned at an equal height by the tops of the cocoa-nut trees. As a white cloud here and there affords a pleasing contrast with the azure sky, so in the lagoon dark

bands of living coral appear through the emerald green water.

"The next morning after anchoring, I went on shore on Direction Island. The strip of dry land is only a few hundred yards wide; on the lagoon side we have a white calcareous beach, the radiation from which in such a climate is very oppressive; and on the outer coast, a solid broad flat of coral rock, which serves to break the violence of the open sea. Excepting near the lagoon, where there is some sand, the land is entirely composed of rounded fragments of coral. In such a loose, dry, stony soil, the climate of the intertropical regions alone could produce a vigorous vegetation. On some of the smaller islets, nothing could be more elegant than the manner in which the young and full-grown cocoa-nut trees, without destroying each other's symmetry, were mingled into one wood. A beach of glittering white sand formed a border to these fairy spots.

"I will now give a sketch of the natural history of these islands, which, from its very paucity, possesses a peculiar interest. The cocoa-nut, at the first glance, seems to compose the whole wood; there are, however, five or six other kinds. One of these grows to a very large size, but from the extreme softness of its wood, is useless; another affords excellent timber for ship-building. Besides the trees, the number of plants is exceedingly limited, and consists of insignificant weeds. In my collection, which includes, I believe, nearly the perfect Flora, there are twenty species without reckoning a moss, lichen, and fungus. To this number two trees must be added; one of which was not in flower, and the other I only heard of. The latter is a solitary tree of its kind in the whole group, and grows near the beach, where, without doubt, the one seed was thrown up by the waves. I do not include in the above list the sugar-cane, banana, some other vegetables, fruit trees and imported grasses. As these islands consist entirely of coral, and at one time probably existed as a mere water-washed reef, all the productions now living here must have been transported by the waves of the sea. In accordance to this, the Flora has quite the character of a refuge for the destitute: Professor Henslow informs me that, of the twenty species, nineteen belong to different genera, and these again to no less than sixteen orders!"—*Darwin*, pp. 540, 541.

The explanation of the origin of these islands most generally received is, that they are based on the craters of volcanoes. When we reflect, however, on their vast number, their proximity, and their great size (especially in the case of the *Atolls* in the Indian sea, one of which is about eighty miles in length, with an average width of only about twenty,*) we agree with Mr. Darwin, that this view can hardly be considered correct. There is another class of reefs, in some respects even more remarkable than those forming lagoon islands, and which may be termed encircling reefs, such as are mentioned by our author at p. 555. The moat, as it may be called, surrounding the mountainous island Vanikoro, which lifts its head like the castle of some giant of romance, and frowns over the spot where *La Peyrouse* was shipwrecked, is even more than 300 feet deep, though Mr. Dar-

* One of the Radack islands of Kotzebue is fifty-two miles long by twenty broad.

win gives the depths as being within those numbers. The great circular coral wall, built by myriads of minute architects, ascends sheer and steep on both sides. "Externally," says Mr. Darwin, "the reef rises from an ocean profoundly deep. The structure is analogous to that of a lagoon, but with an island standing, like a picture in its frame, in the middle."

Of the construction of these encircling reefs, what explanation can be given? No one as far as we are aware, has hitherto attempted it with any thing like success. It is hardly to be supposed that reef-building *polypi* of every different genera should act in concert. Why should the reef spring up at the distance of miles from the shore, and from a depth, whilst we know that reefs—the instances are innumerable—grow attached to the shore?

Mr. Darwin believes that this problem receives a simple explanation, from the fact, that while the land slowly subsides from changes in progress in the subterranean regions, the reefs of living coral continue to grow to the surface. The line of argument which seems to have led him to the conclusion we shall state; but first let us remind those of our readers who may be only partially acquainted with the progress of recent geological inquiry, that proofs of the rise of the land have come in from all quarters of the world. If, then, the globe be not absolutely swelling like the frog in the fable, which no one will grant, there must be tracts which have lately undergone subsidence, or are undergoing it. In ancient times such movements of subsidence have taken place, attested, as every geologist knows, by the vertical trees in the Portland dirt-beds, the alterations of fresh-water and marine deposits, &c. &c.

Mr. Darwin, then, having these facts in his mind, seems to have been led to consider how it comes that enormous areas of deep ocean (p. 558) are studded with low coral islands, and yet that many facts show that reef-building *polypi* do not flourish at greater depths than twenty fathoms at most. What foundation, then, have these coral islands in spaces of many thousand square leagues of a deep, deep ocean? Must we suppose that there are as many submarine mountains as coral islands, all rising within twenty fathoms of the surface of the ocean, and not one above it? Such a supposition will be rejected as monstrous. The only possible alternative then, as it seems to us, is, that "as each point, one after the other according to its altitude, was submerged, the coral grew upwards, and formed the many islets now standing at one level." (p. 558.)

Mr. Darwin next considers whether the peculiar structure of the lagoon islands and encircling reefs occurring in these oceans, which he is forced by the foregoing argument to believe have subsided, receives any explanation from this movement. He says, in substance—let an island fringed with coral reefs very gradually subside, will not the necessary effect of this be, that although the reef may grow upwards and reach the surface, it will not be so with the land, which will gradually be submerged? Then, according to the amount of subsidence so will the width of the channel be between the reef and shore. If the sinking continue, the encircled island, by the gradual submergence of the last and highest peak, will be converted into a lagoon island. Mr. Darwin then ob-

serves (p. 539), that the non-filling up of the interior basin of the lagoon, on the open channel within the encircling reef, is due to those stations being unfavorable (partly owing to the sand and mud drifted about) to the growth of the massive corals. He proceeds to state that a series can be shown from an annular reef, encircling either one or several small islands, to a lagoon island which merely encircles a sheet of water; and he insists that the difference between the various kinds of reefs (p. 556) entirely lies in the absence or presence of neighboring land, and the relative position which the reefs bear to it. Mr. Darwin, therefore, supposes that as a reef fringing an island is converted by subsidence into an encircled one, so a reef fringing the shore of a continent will be converted into a barrier reef (p. 559), like that extraordinary one on the N. E. coast of Australia, separated from the land by a wide arm of the sea; and there the reefs (p. 564) supposed to be produced by the same kind of movement are found in juxtaposition. The reefs of New Caledonia exhibit a step between an encircling and a barrier reef.

Mr. Darwin seems to think that, if this theory be rejected, not only must the origin of lagoon islands encircling a barrier of reefs, and their presence in one part and entire absence in another, remain altogether without explanation—which, considering their vast number and uniformity of structure, would be not a little remarkable;—but that all the facts showing that reef-building *polypi* will not live at great depths must be rejected; for we must then suppose that the reefs have sprung up from submarine mountains, which we cannot grant, over spaces of many thousand square leagues. If, on the other hand, this theory, which includes under one head the origin of the several reefs, he admitted, very important deductions must follow from it; for it shows that great portions of the surface of the globe have recently (in a geological sense) undergone movements of subsidence (which it must always be extremely difficult to detect by any direct evidence); and what is even more worthy of note, it shows that the movements have been so far gradual, that no one sinking down has carried the reef below the small depth from which the *polypi* could rear it to the surface again. So far so good; but Mr. Darwin alludes to even more extended inferences, which we shall not notice, as the subject will soon be treated by him at full length.

ON THE SUPERIOR ADVANTAGES OF GROWING ORCHARD GRASS WITH RED CLOVER.

From the Germantown Telegraph.

Read before the Philadelphia Society for promoting Agriculture, March 4, 1840, by James Mease, M. D., V. President.

My attention was first called to this subject when reading the late Mr. Bardley's 'Notes on Husbandry,' (1799,) in which he states the benefits to be derived from the sowing together the two grasses first mentioned, and his remarks appeared so well founded in reason, that I was disposed to pursue the practice he recommended; but before trying the experiment, I consulted the late Algernon Roberts, of Philadelphia county, one of our best farmers, on the subject, and was pleased to hear him approve of the measure.

My question was, "which was the best grass to grow with red clover?" He answered at once, "orchard grass," by reason of their blossoming at the same time, and the orchard grass giving early and late pasture, which was a great object with him, as he devoted his attention to the supply of butter for the Philadelphia market. Joseph Cooper, of New Jersey, to whom I also applied for an opinion on the same point, was equally prompt in favor of the union of the two grasses in question. Thus backed, I had no hesitation in deviating from the usual routine adopted in Delaware, and still continued very generally throughout Pennsylvania; and upon the first field of wheat which I laid down, viz: in 1805, I had sown the following spring, 12 measured pints of clover seed with one bushel and a half of orchard grass seed previously well mixed.—After the grain was removed, I saw, with very great delight, both grasses thickly covering the ground, and nearly as high as the stubble; and late in the autumn had the satisfaction to see my cows enjoying a luxurious, succulent repast, after the fields which were sown with timothy and clover in the vicinity had ceased to supply it. But this gratification was small when compared with that I experienced the following spring, by beholding the towering orchard grass in full blossom at the same time with its companion, and the ground thickly set with both. Reserving a certain space for maturing the seed of the orchard grass, I had the crop cut when a few only of the clover blossoms were beginning to turn, being then sure of perfect maturity of the rest, and found that they, equally with the leaves, retained their connexion with the stalk much better than when the grass was cut after the clover blossoms had assumed a dark hue. Another advantage attending this early cutting is, that the stalks preserve their pliancy and are eaten freely by cattle; whereas they are wasted when they become hard from the mowing having been done at a late period.

My experience of six years of the union of the two grasses enables me to say that the advantages of sowing orchard grass in preference to timothy, are as follows:

1. Two crops in place of one.
2. Good pasture late in the autumn instead of none.
3. The curing of both grasses in full perfection, while, when timothy is sown, the clover blossoms and leaves are dead, black, and chiefly fall off in the curing of the hay, owing to the ripening of the timothy from 12 to 15 days after the clover. Farmers will never cut their grass until the timothy is fit for the scythe.
4. Early pasture, even before the pestiferous, hateful wild garlic makes its appearance, or at least as early as the latter, and by its rapid growth, smothered or lessens the crop of this enemy to the products of the dairy. The same remarks apply to the autumnal growth of garlic.

Orchard grass is upon a par with timothy, in point of nutritive quality and of animal partiality, and will command nearly as great a price as timothy. Two crops, and the early and late pasture of the orchard grass make up for the small difference in the price of hay from the two grasses.

THE RESULTS OF MARLING IN THE COUNTRY ABOUT WILLIAMSBURG.

If any person yet doubts the value of marl as a means of profitable and durable improvement of land, and therefore hesitates or delays to use this manure, let him visit the country surrounding Williamsburg, and see the marled and the unmarled lands, and learn the circumstances from the proprietors. And if such an inquirer should be one of the young men formerly educated there, and who has not been there for twenty or more years, he will need no verbal information to assure him of the remarkable improvement made, nor any arithmetical statements to convince him of great increase of fertility and of wealth. We do not know whether any doubters or deniers of the value of marling yet remain in lower Virginia; but there are many such in the more southern states; and it would be not only worth the expense of the journey, but perhaps a fortune to boot, for any such persons, having the means of marling, to come here and learn what profits others have made by this most valuable of all the means for fertilization.

Twenty years ago, the general condition of agriculture of the counties of York and James City, was among the lowest in Virginia. The lands, excepting some of the rich river margins, (which *Nature had marled*, and which man had been laboring in vain to exhaust,) were generally poor, and the profits of cultivation very low. The prices of lands, both the rich and the poor, were astonishingly low, even after making every allowance for their wretched cultivation and products. Some of the poor lands, but with plenty of marl, and easily and cheaply improveable, and within a few miles of ship navigation, sold for about \$1 the acre; and \$3 was deemed a very good price.

Other things were in accordance with the condition of agriculture. There was but one thing that formed an exception. The last survivors of the old aristocracy of the ancient capital of Virginia yet lingered, and their fortunes had not been entirely spent in wasteful hospitality, nor disappeared by division and subdivision. And to this cause it was owing that the society of the generally decayed and partly ruinous village of Williamsburg was more refined, and social intercourse more delightful, than in cities exhibiting the very different indications of general prosperity and great individual wealth. But with this exception, which was yearly becoming more faint, and has since almost disappeared, every thing in Williamsburg then was the accompaniment of decay, or an indication of approaching ruin.

The College of William and Mary, however, up to 1812, had been what was then deemed prospe-

rous, even considering it, as it was then and previously, the most important and almost sole institution of learning of high order of all Virginia, and which received students also, every year, from every southern and south-western state of the confederacy. From 60 to 70 students in the scientific and law classes served for this state of prosperity. It was rare for a student to be sent from the adjacent counties, and then only from houses whose fortunes were declining, and never from one where recent industry had served to produce wealth. The people generally were poor and ignorant, and too ignorant to prize education for their sons, even when abundantly able to pay its price. The money brought by the students of the college was almost entirely a foreign supply, and served as an important aid to the support of the village, and its adjacent country. Even this aid was lost, when, for causes not necessary to be here stated, the college afterwards declined so much as to have less than 20 students a year.

But when every thing else was at the lowest state of depression, marling had been commenced some years before by a few proprietors, and the improvement was slowly, but at a yearly increasing rate of progress, advancing over the neighboring country, which was eminently suited to be so improved, in consequence of the natural character of the soil, as well as because of the good quality of, and easy access to the marl beds. In a few years almost every proprietor was marling, to some extent; and most persons near Williamsburg have now marled the greater part, or all, of their cultivated lands.

It is not our purpose here to state the particulars of any improvements and profits made by marling. We hope to receive a report of that description from a gentleman who has promised it, and who is well qualified by experience as an improver, as well as by his other sources of information, to present the marling statistics of his part of the country. It is enough here to state generally what we have recently learned in that neighborhood.

The present fertility of the formerly very poor lands is not only great *relatively*, but *absolutely*. The crops are good, even without reference to, and comparison with, the former miserable products; the change from which appears so wonderful to those who now visit the country for the first time after 20 or 30 years' absence. The crops are from double to quadruple their former rates, and of course the net profits of culture are far more increased. The prices of land have also risen nearly as much as its product, or as its means for improvement offer, even in advance of the actual marling. The formerly poor cultivators have not

only improved in wealth, but still more in the manner of using their wealth. They prize education, and are now sending their sons to fill the college, which their fathers made no use of. The same cause is working throughout lower Virginia, though not so perceptibly as here; and, while we give full credit to the reformation and improvement of this institution of learning itself, and highly appreciate the learning and worth of its professors, and the value of its regulations and discipline, we still believe that to *marling* the College of William and Mary owes much of its progressive increase within seven years, of from only 17 students in 1834 to 140 at the present session.* The professors, and the course of instruction, might have had all their great and acknowledged value; but as vainly as in former times would these advantages have been offered to the people of the adjacent country, if their increase of wealth had not produced among fathers a demand for, and also the means of supplying scientific education for their sons.

Williamsburg, for the greater part, still presents the appearance of a town in decay. For although the prices of lots and houses are tripled, a few years will not suffice to repair such extensive delapidations as had been permitted to take place. But there are sufficient indications now that repair is in fast progress, and resuscitation close at hand. Not only have many of the old and in some cases ruinous buildings been thoroughly repaired, but new and costly houses have been recently erected; and it is manifest that this ancient city (in rank, though but a village in size,) which was beautiful even in decay, and when almost in ruins, before long will exhibit the different kind of beauty of newness and of growing prosperity. The trade of the place has risen to importance, and its merchants are highly respectable and wealthy. And this great change of the state of trade, though now greatly aided by the present prosperity of the college, had commenced, and had proceeded far, while the college was actually sinking.

The support and, we trust, the fruits of religion have been increased as much and as manifestly as other benefits; and we hope not to be charged with being wanting in reverence for religion, when we assert that its service also has been as essentially promoted by *marling*, as we have

* The following statement shows the number of students, and the rate of increase, in the seven last years. In the session of 1833-4 there were 17 students.

1834-5	48
1835-6	67
1836-7	113
1837-8	118
1838-9	123
1839-40	140

claimed for the increase of fertility, of wealth, education, and general refinement. Until recently, the public worship of the episcopal church was mainly, though indirectly, maintained at the expense of the college. The president of the college, or one of the professors, always was an episcopalian clergyman, and one of such grade of learning or of reputation as could not otherwise have been obtained here; and thus the services of the church were maintained at very small additional expense to the inhabitants. The most venerable old church in Virginia, and an excellent and costly building, they inherited from the old establishment. The other denominations of Christians were much worse off, and their public religious services on the most tumble footing. Now all are greatly advanced, and are still advancing. The former connexion between the college and the church has been effectually severed, we trust for the good of both parties; but certainly and greatly to the benefit of the college. The members of the episcopal congregation now pay for, and entirely support their own church and its service, and that too with a degree of liberality, and to an amount of expenditure, which are remarkable for so scanty a population. The most costly, and what is deemed the greatest improvement thus made, the thorough alteration and repair of the interior of the old church, we could well have spared, and indeed cannot but regret the change. Compared to the old fashion of the church, with its spacious area, and its long and gloomy aisles, floored with stone and interspersed with old monumental inscriptions, and the general simplicity, and absence of decoration, the present interior has the elegance and luxury of a modern drawing room. But the unquestionable beauty and comforts of the newly modelled interior do not adequately compensate for the loss of the severe and simple grandeur of the old structure. More than \$3000 have been recently expended to repair and *dandify* the church, and at the sacrifice of half its space, and the destruction of every appearance of what was antique, solemn, and venerable. Fortunately, the exterior of the building could not be damaged by modern improvement and decoration; and therefore the church retains its ancient form, and is now, as always to our taste and feelings, more admirable and impressive in its simple and even rude style of architecture, than the most costly and highly adorned of modern churches.

The present prosperous and excellent condition of the College of William and Mary will be the most highly appreciated by those who are most intimately acquainted with the existing facts; and will be deemed most remarkable by those who best knew it formerly, in what was then deemed its

time of greatest prosperity. Then, when without a rival in Virginia, or scarcely in the south, about 70 students was the highest average number; and no one then questioned or doubted the received opinion, that the institution was highly prosperous, and in entirely successful operation. Afterwards various causes concurred to depress the institution, and to bring it to the brink of ruin. After nearly 20 years of fluctuation and adversity, and of general decline, as late as 1834 there were but 17 students. Then commenced the fortunate change; and a very regular and rapid increase has brought the number this year to 140 students in the law and scientific classes, or to double the number of the greatest average of old times. Yet now William and Mary is so surrounded and pressed upon by rival and successful institutions, that all that can be now deemed its proper province is the tide-water region of Virginia; and even of that, very many of the young men are sent by their mistaken parents to northern colleges of far less worth, than now may be justly claimed for William and Mary, both in regard to the ability of its professors and the excellence of the course of instruction. A course so mistaken, and so opposed to patriotism, as well as to the private interests and welfare of the individuals so acting, cannot long continue; and we predict that, even if no more extended ground should be occupied by this college, the tide-water and marl region of Virginia alone will still more swell the number of its pupils. But, in fact, its present field of operations is much more extensive; and more than half its students still come from the upper country.

But to return from this digression. Any stranger to this part of the country, who may read and believe these or other published statements of the improvements here made by marling, would naturally infer that the whole marl region of Virginia was pursuing the like profitable course. But such is not the case. It is true that nobody now denies the value of marl, and the profit of applying it as manure. But still, so slow is the progress of the most valuable and undoubted improvements upon old practices, that often years are required for a new practice to extend a few miles. Wherever some one intelligent and energetic farmer in lower Virginia has gone to marling on a large scale, his example has gradually spread to all the farms around him. But without such an intelligent and spirited pioneer, to exhibit to the eyes of his neighbors the benefits and profits of the practice, the experiments are small and few, and but little is done for general or extensive operations. The neighborhood of Williamsburg, and extending to more than 12 miles above, is one of the

most generally marled and thereby best improved districts of Virginia. Yet but a few miles outside of this gradually widening circle, marling is comparatively neglected, and some proprietors have even done nothing as yet to obtain the profits from it, which they might command as cheaply as any other persons. But though the progress of this mode of improvement, like every other in our benighted agricultural condition, is slow, compared to what it should be, still it is steadily gaining ground, and never loses ground or favor where once commenced. It may be long before the completion—but we nevertheless have undiminished confidence in our prediction often heretofore made, that, by means of marling, the tide-water region of Virginia is destined to become the most valuable agricultural region of the state, and one having agricultural advantages inferior to but few regions in the world.—ED. F. R.

UNIVERSITY OF VIRGINIA.

List of Graduates of July 4th, 1840.

Degrees were conferred by the chairman of the Faculty on the following students, who had been admitted by the Faculty to graduate in the schools mentioned:

School of Ancient Languages.

Charles H. Barksdale, Charlotte, Va.
John Stage Davis, University of Va.
John N. Hendren, Augusta Co., Va.
Carter Page Johnson, Richmond, "
Francis R. Rives, Albemarle Co., "
C. R. G. Slaughter, Charlottesville.
James D. Thornton, Cumberland, Va.

Latin Language and Literature.

George W. Abell, Albemarle Co., Va.
James H. Brame, Mecklenburg, "
John S. Caskie, Richmond City.
V. Saunders Paul, Louisa Co., Va.
John Prosser Tabb, Gloucester, "
S. Dandridge Tucker, Richmond, Va.
Albert P. Whitehead, Alabama.

School of Modern Languages.

Charles H. Barksdale, Spanish and Anglo-Saxon, Charlotte Co., Va.
John L. Burruss, French and German, Louisa Co., Va.
Lucius J. Dupre, French and Spanish, Louisiana.
James D. Thornton, French and Spanish, Cumberland Co., Va.

French Language and Literature.

Colin B. Buckner, Lynchburg, Va.
John S. Caskie, Richmond.
Benjamin E. Green, Baltimore, Md.

Thomas F. Perkins, Buckingham, Va.
Joseph A. Shanklin, South Carolina.
C. R. G. Slaughter, Charlottesville.
S. Dandridge Tucker, Richmond, Va.

Italian Language and Literature.

Henry Stokes, Lunenburg Co., Va.

Spanish Language and Literature.

W. C. Carrington, Charlotte Co., Va.
Henry C. Lay, Richmond City, Va.
Albert P. Whitehead, Alabama.

Anglo-Saxon Language and Literature.

John S. Barbour, jr., Culpeper, Va.
John Prosser Tabb, Gloucester, "

School of Mathematics.

George W. Abell, Albemarle Co., Va.
Robert L. Brown, Nelson, "
John W. Clay, Huntsville, Ala.
Lewis W. Cabell, Buckingham Co.
John P. DuVal, Florida.
William L. Early, Madison Co., Va.
Hunter H. Marshall, Charlotte, "
Lewis Turner, Louisa Co., "
S. Dandridge Tucker, Richmond, "
John Randolph Tucker, "
Thomas H. Watte, Ala.

School of Natural Philosophy.

George W. Abell, Albemarle Co., Va.
Benjamin J. Barbour, Orange, "
Charles H. Barksdale, Charlotte, "
Henry Coalter Cabell, Richmond, "
John S. Caskie, "
Wm. C. Carrington, Charlotte, "
John Stage Davis, University of Va.
Wm. P. DuVal, Florida.
Robert L. Dabney, Louisa, Va.
Carter Page Johnson, Richmond, Va.
Warwick N. Miller, Kentucky.
Francis R. Rives, Albemarle, Va.
Joseph A. Shanklin, South Carolina.
Lewis Turner, Louisa Co., Va.
John H. Timberlake, Charlottesville.
Isaac R. Watkins, Charlotte Co., Va.

School of Civil Engineering.

Wm. P. DuVal, Florida.
John C. DuVal, "
Robert B. Moon, Albemarle, Va.

School of Chemistry.

John S. Caskie, Richmond City, Va.
Henry Coalter Cabell, Richmond, Va.
John W. Clay, Huntsville, Alabama.
John Stage Davis, University of Va.
Robert L. Dabney, Louisa Co., Va.
C. Temple Emmet, New York.
William H. Jones, Mecklenburg, Va.
James F. Jones, Frederick Co., Va.
Warwick N. Miller, Kentucky.
Marcellus M'Kennie, University of Va.

Carter Page Johnson, Richmond, "
 Thomas F. Perkins, Buckingham "
 Alex. H. Rogers, Albemarle, "
 Gales Seaton, Washington City, D. C.
 Joseph A. Shanklin, South Carolina.
 C. R. G. Slaughter, Charlottesville.
 James D. Thornton, Cumberland, Va.
 Thomas Towles, Louisiana.
 William Watts, Roanoke Co., Va.
 Isaac R. Watkins, Charlotte, "
 James L. Woodville, Botetourt, "

School of Medicine.

Eleazar G. Clay, Chesterfield, Va.
 William Hamilton, Staunton, "
 Patrick Henry, Campbell Co., "
 J. Philip Smith, Clarke Co., "
 J. Archer Talley, Cumberland, "
 Reuben P. Thomas, Buckingham,
 William Watts, Roanoke, "
 James B. Winston, Culpeper, "

School of Moral Philosophy.

John S. Barbour, jr., Culpeper, Va.
 Robert L. Brown, Nelson, "
 James H. Brame, Mecklenburg, "
 Colin B. Buckner, Lynchburg, "
 John Stage Davis, University of Va.
 William L. Early, Madison Co., Va.
 Wm. H. Jones, Mecklenburg, "
 Joel W. Jones, Alabama.
 Carter Page Johnson, Richmond, Va.
 F. Lewis Marshall, Fauquier, "
 James L. Orr, South Carolina.
 Thos. F. Perkins, Buckingham, Va.
 Francis R. Rives, Albemarle, "
 Wm. J. Shelton, Lynchburg, "
 Thomas Slaughter, Mississippi
 C. R. G. Slaughter, Charlottesville.
 Nicholas T. Sorsby, Alabama.
 Isaac R. Watkins, Charlotte Co. Va.

School of Law.

John D. Bracey, Alabama.
 R. Hume Bntcher, Alexandria, D. C.
 Henry W. Davis, "
 Wm. S. Goodwyn, Southampton, Va.
 F. Lewis Marshall, Fauquier, "
 John W. Menzies, Kentucky.
 Geo. W. Randolph, Albemarle, Va.
 T. Jaquelin Smith, Clarke Co., "
 Stephen O. Southall, Amelia Co., Va.
 John O. Steger, "
 Joseph D. Shields, Mississippi.
 Jaq. P. Taliaferro, Orange Co., Va.
 Geo. W. Truehart, Charlottesville.
 Dabney Carr Wirt, Richmond City.

WILLIAM AND MARY COLLEGE.

Public exercises and honors of July 4th, 1840.

1st. An Oration on the effects produced by the introduction of Free Institutions, and the extension of liberal principles: by Edmund W. Jones, L. B. of N. Carolina.

2nd. An Oration on the Right of Instruction: by Wm. Old, L. B. of Powhatan.

3d. An Oration on the Reciprocal Action of Mind and government: by Geo. W. Richardson, A. B. and L. B. of Hanover.

4th. An Oration on the Past and Present Condition of our Country: by William Waller, L. B., of Williamsburg.

5th. An Oration on the Decline and Fall of the Grecian Republics: by Warner T. Jones, A. B. and L. B., of Gloucester.

6th. An Oration on the Present Condition and Future Prospects of the American Union: by M. B. Seawell, L. B., of Gloucester.

7th. An Oration on the Influence of Patriotism, and the Diffusion of Knowledge upon a Republic, and the Progress of the Arts and Sciences within the United States: by Lloyd W. Williams, L. B. of Norfolk.

After an Address from the President to the Students, the Degree of *Master of Arts* was conferred on

Benj. F. Dew of King and Queen,

A. C. Peachy of Williamsburg.

The Degree of *Bachelor of Law* was conferred on

Wm. E. Blankingship of Chesterfield.

Joseph M. Carrington of Richmond,

Wm. E. Clarke of Alabama,

John H. Dillard of N. Carolina,

John Finney of Powhatan,

Alex. Jones of Chesterfield,

Edmund W. Jones of N. Carolina,

James B. Jones of Chesterfield,

Warner T. Jones of Gloucester,

Wm. Old of Powhatan,

James H. Rawlings of Spottsylvania,

George W. Richardson of Hanover,

M. B. Seawell of Gloucester,

William Waller of Williamsburg,

Lloyd W. Williams of Norfolk.

The degree of *Bachelor of Arts* was conferred on

L. W. Carter of Charles City,

Geo. R. Dupuy of Petersburg,

Wm. H. Gwathmey of King William,

Thos. H. Harrison of Sussex,

Warner T. Jones of Gloucester,

David E. Meade of Dinwiddie,

John Minge of Charles City,

Geo. U. Nottingham of Northampton,

James H. Rawlings of Spottsylvania,

George W. Richardson of Hanover,

Wm. H. Sims of Halifax,

Tristram L. Skinner of N. Carolina,

John B. Stanard of Fredericksburg,

Thomas S. Watson of Louisa,

Wm. C. Williams of Richmond

Certificates of Proficiency, in the subjects specified, were conferred on the following gentlemen: Wm. T. Allen; Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, Jun. Mathematics and Metaphysics.

Wm. H. Anderson: Belles Lettres, Rhetoric, Logic, Ethics, History and Chemistry.

F. M. Baker: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law and Metaphysics.

F. L. Barziza: Chemistry.

Wm. E. Blankingship: Political Economy and Metaphysics.

Norborne Blow: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry and Jun. Mathematics.

Wm. N. Blow: History and Chemistry.

Jas. Boisseau: History and National Law.

Thos. H. Bullock: Political Economy.

Joseph M. Carrington: Belles Lettres, Rhetoric, Logic, Ethics and History.

William E. Clarke: Political Economy and Metaphysics.

James A. Clopton: History.

James W. Cook: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law and Mathematics.

O. A. Crenshaw: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry and National Law.

John H. Dillard: Belles Lettres, Rhetoric, Logic, Ethics and History.

J. F. Dilley: Political Economy.

J. F. Edmunds: Belles Lettres, Rhetoric; Logic, Ethics, Chemistry and National Law.

E. D. Farrar: History.

A. C. Garrett: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, Jun. Mathematics and National Law.

Bataille J. Gouldin: History and Jun. Mathematics.

John S. Hannon: Chemistry.

John Harrison: Chemistry and National Law.

John T. Hatcher: Belles Lettres, Rhetoric, Logic, Ethics, History and Jun. Mathematics.

Leo. Henley: Chemistry.

Daniel C. Holliday: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, Jun. Mathematics and National Law.

Benjamin Irby: Belles Lettres, Rhetoric, Logic, Ethics, National Law, and Nat. Philosophy.

Peyton Meade: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law and Mathematics.

Jesse S. Miller: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law, and Jun. Mathematics.

John E. Moore: Belles Lettres, Rhetoric, Logic, Ethics, National Law, and Chemistry.

George U. Nottingham: History.

John H. Nottingham: Chemistry and National Law.

William Old: Political Economy and Metaphysics.

John B. Peachy: Chemistry, Jun. Mathematics and History.

J. P. Pierce: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

David W. Pitts: Belles Lettres, Rhetoric, Logic, Ethics and National Law.

William Radford: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law and Political Economy.

James M. Robertson: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

L. B. Rose: Belles Lettres, Rhetoric, Logic, Ethics and Chemistry.

Thomas F. Scott: Belles Lettres, Rhetoric, Logic, Ethics, Chemistry and National Law.

M. B. Seawell: Political Economy.

Churchill Semple: Political Economy and Metaphysics.

Ed. B. Shelton: Chemistry and Jun. Mathematics.

Reuben Smith: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

Waddy Street: Chemistry.

William B. Taliaferro: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, and Jun. Mathematics.

John H. Taylor: National Law.

William A. Temple: Belles Lettres, Rhetoric, Logic, Ethics, Chemistry and National Law.

J. S. Trueheart: Belles Lettres, Rhetoric, Logic, Ethics, History, National Law, Chemistry, and Jun. Mathematics.

Wat. H. Tyler: Belles Lettres, Rhetoric, Logic, Ethics, and History.

C. C. P. Waller: National Law.

John D. Warren: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, National Law, and Mathematics.

A. A. Whitehead: History, Chemistry, and National Law.

Lloyd W. Williams: Political Economy and Metaphysics.

Thomas M. Wilson: History.

L. Y. Winder: Belles Lettres, Rhetoric, Logic, and Ethics.

J. T. Wooton: Belles Lettres, Rhetoric, Logic, Ethics, History, Chemistry, and National Law.

ON IMPROVEMENT BY RAIL-ROADS AND CANALS.

Extract from an article in the New York Review for April 1860.

In the meanwhile, it has occurred to us that great misapplications of capital might be prevented, if the public could be induced to examine, more closely than it has hitherto done, the different subjects of enterprise presented to its attention in our country. Various and extensive as our schemes are, there seems to us necessity for care in the selection of objects on the part of the public, proportionate to the want of it in our state legislatures. At the present rates of interest in this country and in Europe, it is obvious that the most promising enterprises only should be undertaken. Of these, some may be fit objects for execution by a state, but not by individuals; and in cases where lines of improvement properly carried out promise large results, disappointment may ensue if they be executed on an ineligible plan, or on a scale incommensurate or more than commensurate with the object. We are induced to avail ourselves of the publication of Mr. Chevalier, at the head of this article as a text to present some reflections on this subject. The philosophic and comprehensive mind of the writer generalizes, in the following sketch, the object of improvement in the United States:

"The territory of the United States consists, first, of the two great interior basins of the Mississippi, and of the St. Lawrence, which descend, one from the north towards the south into the Gulf of Mexico, the other from the south towards the north into the bay to which it gives its name; secondly, on its eastern coast, of a system of lesser basins which discharge into the Atlantic, and the principal of which are, those of the Connecticut, the Hudson, the Delaware, the Susquehanna, the Po-

tomac, the James River, the Roanoke, the Santee, the Savannah, the Altamaha. The Alleghany mountains, which are called the *back bone* of the United States, on account of their form lengthened out regularly with the continent, constitute a natural separation between the two great interior basins, and the system of lesser basins on the Atlantic coast.

"This immense country may likewise be divided into north and south. It has two commercial capitals, New York and New Orleans, which are as the two lungs of this great body, the two galvanic poles of the system. Between these two divisions, the north and south, there exist radical differences in their political condition and habits of life. The social edifice of the south is founded on slavery, that of the north on universal suffrage. The south is an immense cotton plantation, with some other products, such as tobacco, sugar, and rice. The north acts as the commission merchant of the south, in selling its products, and procuring those of Europe for it; as its mariner, in carrying its cotton across the ocean; its manufacturer, for all household and agricultural utensils, *cotton gins*, steam engines for making sugar, furniture, and stuffs, and all objects of every day use. It supplies the south also with flour and salted meats.

"It follows from the above, that in the United States great public works must have for their objects,

"First. To bind the shore of the Atlantic with the country west of the Alleghany; that is to say, to connect rivers, such as the Hudson, the Susquehanna, the Potomac, the James river, or bays, such as the Delaware or the Chesapeake, either with the Mississippi, or its tributary the Ohio, or with the St. Lawrence, or the great lakes Erie and Ontario, whose waters are conveyed by the St. Lawrence into the sea.

"Second. To establish communications between the valley of the Mississippi and that of the St. Lawrence, that is to say, between one of the great tributaries of the Mississippi, such as the Ohio, the Illinois, or the Wabash, and Lake Erie, or Lake Michigan, which lakes of all those which have an outlet by the St. Lawrence, extend farthest south.

"Third. To connect the north and south poles of the Union, New York and New Orleans.

"Independently of these great systems of public works, which are in progress of construction, and even in part executed, there exist secondary groups of lines of transportation, having for objects either to facilitate the access to centres of consumption, or to open outlets to certain centres of production. The first of this class of cases embraces different works, canals or rail-roads, which leave the great cities as centres, and radiate in different directions around them. The second comprises such works as have been executed to bring into market different coal fields."

Mr. Chevalier proceeds to inform us how far these objects have been carried out, and gives us in minute detail, an account of the different lines of communication executed and in progress at the time of the publication, of his pamphlet. Few Americans are, we believe, fully aware of all that has been done in our country, and all may read the clear and comprehensive digest of Mr. Chevalier with profit. He shows that lines of im-

provement have been executed, or are in progress, to connect most of the lesser basins of the rivers flowing into the Atlantic with the two great interior basins west of the mountains. All of these lines of communication, with the exception of the great canal of New York, are entirely or in part by rail-road; the Pennsylvania and Virginia lines of improvement, embracing that mode in part, whilst the New York and Erie rail-road, the Baltimore and Ohio rail-road, and the proposed communications in South Carolina and Georgia, look to the rail-road system of improvement throughout. The elevation and character of the Alleghany range, being generally without any table land from which reservoirs can be supplied, makes this the only mode of traversing it at any reasonable expense.

There is, however, no doubt, that for the bulky transportation between the west and east, rail-roads of any profile which can be had across the Alleghany, promise results by no means commensurate with what may be expected from them under advantageous circumstances. Moderate elevations on a rail-road, to be overcome by short ascending and descending grades of gentle inclination, present no serious impediment, when the business of the road (as in the case of travellers and the mail) requires high velocities. At high rates of speed, the whole adhesion of the engine cannot be made use of, of course there can be no deficiency in this respect, and but little power being required in descending grades, steam is accumulated for encountering the ascending, so that almost as great an amount of useful effect is thus attained from a given power on an undulating road of gentle graduation, as on a level. The case is a very different one, when on a long line of rail-road the ascent is a continuous one to a culminating point, whence the rail-road descends. If the ascent to be overcome is very considerable, it may be surmounted either by inclined planes and stationary power, or by graduation, or partly on each plane, but it is in any case a serious deduction from the value of the rail-road, in the one case, by the cost of keeping up stationary power, in the other, by the large deduction from the useful effect of the locomotive engine.

The Pennsylvania line of improvement, and the Baltimore and Ohio rail-road, present illustrations of these two modes of overcoming elevation. On the former, the Alleghany mountain is passed by a rail-road having ten inclined planes, kept up at an annual expenditure of not less than eight thousand dollars. The elevation overcome at these planes is of course to that extent a necessary tax on the trade between Philadelphia and Pittsburgh. On the Baltimore and Ohio rail-road, should the trade be a large one, a much heavier tax must be paid in a different form. On that line of improvement, inclined planes will be avoided, and in place of them, continuous ascending and descending grades will be adopted, both at Parr's Spring Ridge and the Alleghany. These, it is understood, are, for considerable distances, at the rate of fifty and sixty, and in some cases, as much as seventy or eighty feet per mile. On such grades, the load drawn by a locomotive will not exceed the fourth of what it would be on a level, and the cost of transportation to the company must of course in nearly the same ratio be increased.

The above suggestions go to show, that the cost

of transportation on lines of rail-road, between the east and west, south of New York, must necessarily be much enhanced beyond what may be considered its minimum. Whilst, under these circumstances, the great and growing demands of the west will probably supply an abundant trade to all the avenues now being opened for it, disappointment would certainly be experienced, were it supposed that the revenues derived from the improvements would be in proportion to the trade. The great and peculiar expenses of transportation on these lines, however large their receipts, must necessarily increase in almost the same ratio. Fortunately, these lines of improvement, if not owned, as in the case of the Pennsylvania line, by the states in which they lie, are the property of corporations consisting essentially of states and towns, to which the other benefits to be derived from the improvements, and not the dividends in stock, have been the leading considerations to embark in them. Such is the case with the Baltimore and Ohio rail-road, the James river, and Kenhawa improvement, and the Charleston, Cincinnati, and Louisville rail-road. The stock of these companies is made up principally, in the case of the Baltimore and Ohio rail-road, by the state of Maryland and city of Baltimore; of the Chesapeake and Ohio Canal, by subscriptions of the states of Maryland and Virginia, and of the Federal Government, the latter having assumed the subscriptions of the corporations of Washington, Georgetown, and Alexandria; and in the case of the Charleston, Cincinnati, and Louisville rail-road, by subscriptions of the states of South Carolina and city of Charleston. It will be sufficient for the large subscribers to these great works, if the prosperity of the states through which they pass, and towns which they connect with the interior, is promoted in a degree correspondent with the expectation entertained in relation to them, and the amounts invested by individuals are probably but limited sums, which, they have been willing to contribute, even if lost, to promote by their example and countenance the improvements in which they have embarked.

It is obvious that it would not be desirable for individual capital to be invested to any great extent in improvements of this description. States and corporations, whose credit may enable them at favorable times to make loans in Europe at a reduced rate of interest, by adding to the revenues derived from them a very limited fund from taxation, may meet the interests occurring on their loans, and benefited as they are in more essential respects, may afford to wait long for a net revenue, equivalent to the interest on their investments; but to individuals, such investments to any great extent would prove certain bankruptcy and ruin.

It would be otherwise of the second class of improvements referred to by Mr. Chevalier, namely, those which are to connect the lakes and the St. Lawrence with the valley of the Mississippi, were it not that so many will probably be authorized as to destroy the productiveness by competition. The lowness of the summits, and abundance of water to obtained on them, admit of the construction of canals at many points at a very moderate rate of expense, and the extensive navigation on the lakes, and the Mississippi, and their tributaries, and the great agricultural and mineral wealth of the regions watered by them, ensure, whenever

they may be even partially filled up with population, an immense trade. Lines of communication in this portion of the Union must, however, for some time yet be unproductive, and will always, probably, be unsafe investments for individuals, for the reasons already given.

There is no such uncertainty as to the third line of communication mentioned by Mr. Chevalier, that between New York and New Orleans. Connecting, as this does, the metropolis of the union with the great Atlantic cities of the northern and the capitals of the southern states, this line of communication has at the same time the advantage of forming the most direct line between the eastern and southern states, and of traversing a belt of country which presents, for the execution of a line of rail-roads, peculiar facilities. The public has evinced its perception of the advantages of this great line of thoroughfare, by the large amount which has been contributed within the last six or eight years, almost entirely from individual resources, to its execution. The separate links which have been so far made, bid fair, even should it not be extended beyond its present terminus in the south, to be extremely profitable; but there is scarcely a doubt, that within six or eight years more, the whole chain of communication will be completed to New Orleans, and that there will then be a travel and trade over every portion of it, beyond any present conception of its extent.

At the time of the publication of the sketch of Mr. Chevalier, detached links only in this chain of communication had been made as far as the Roanoke, in North Carolina. Within the two years which have since elapsed, the Philadelphia and Baltimore, the Richmond and Fredericksburg, and Richmond and Petersburg rail-roads, have been put in operation; and south of the Roanoke, lines of rail-road have been completed to Wilmington in North Carolina, at the mouth of the Cape Fear, and to Raleigh, the capital of the state on the more direct route to Columbia and Augusta. Between Columbia and Branchville, on the line of rail-road which connects Charleston and Augusta, a rail-road is now in progress of construction, which, it is understood, will be completed in the course of the present, or early the coming year, leaving only the distance between Raleigh and Columbia (about two hundred miles, but which is said to be of extremely easy execution) to be constructed, to furnish a complete rail-road communication between New York and Charleston and Augusta. Between Augusta and Montgomery, on the Alabama river, whence to New Orleans there is for about two thirds of the year an excellent steamboat communication, rail-roads now in progress of execution will probably be finished by the time the line north of Augusta is in readiness.

Great profits may undoubtedly be anticipated in every portion of this great chain of communication, when executed with tolerable judgment and under favorable charters. In another point of view, however, it is much more interesting to us. No line of improvement which has been projected in America, and perhaps none which can ever be made, is so important in a political as well as a commercial aspect, as the one we have been contemplating. In time of war, the government will be enabled by it, with a moderate standing army, to provide for the defence of its whole Atlantic coast,

an object not to be attained effectually without it by the whole force of the country. It will furnish, in such a contingency, the means not only of transporting men and munitions of war, but in the event of the blockade of the coast, of exchanging the staples of the south and the manufactures of the north and east. In the estimation of the patriot, devoted above all things to the preservation of the Union, this connexion, between what Mr. Chevalier terms *its two poles*, has yet a higher value. "When," he remarks, "New York shall be only six or eight days' journey from New Orleans not only for a rich class travelling in a privileged manner, but for every shopkeeper and every workman, separation will be no longer possible. Great distances will have disappeared, and this Colossus, ten times vaster than France, will maintain its unity without effort."

It is among the many fortunate circumstances of our country, that its most essential line of improvement offers such strong inducements to its speedy execution, both in prospects of profit presented by it as an investment, and its other advantages. In other countries, the works essential to their defence and protection have been executed usually at great cost, and with heavy burthens on the subject. With us, the one which is to make us impregnable in war, and to unite us indissolubly in war and peace, is, at the same time, to add largely to the wealth of the nation, and of the shareholders of the companies co-operating in its execution.

We have observed above, that *lines of communication* may be judicious, and *the plan of improvement* be otherwise; or, if the line and plan of improvement be both eligible, an error may be committed in making the improvement incommensurate, or more than commensurate with its objects. We need only refer, in illustration of our position, to the opposite plans of connexion by canal and rail-road, or to the case of a single or double track rail-road. It will be easily perceived, that a trade or travel, which would pay a large profit on the stock of a rail-road, might not be commanded by a canal, and *vice versa*; and that whilst it would be a great error to make a double track rail-road where a single track rail-road would suffice, it would not be a less error to construct a road graded for a single track only, where a double track would be required.

There are, comparatively, few cases in our country, where there is a choice as to the plan of improvement. Its bold features, and the extreme heat of its summers, limiting the cases in which canals can be made to comparatively a small number; but where either a canal or rail-road may be adopted, it is obvious that a great error would be committed by selecting that least suitable to the circumstances of the case and the trade to be accommodated. In our opinion, and the opinion of engineers who have given most attention to the subject, there are three cases in which rail-roads present decided advantage over canals:

1. *Where persons, or articles of great value are to be transported.* In this case, the saving in time becomes a matter of much more moment than any increased cost of rail-road over canal transportation.

2. *Where great differences of level are to be surmounted.* In this case, the delay and risk of

interruption from a large amount of lockage, is far beyond what would be occasioned by inclined planes overcoming the same elevation on a rail-road, whilst the same causes increase the cost of canal transportation to so nearly an equality with that of rail-roads, as to entitle the latter to the preference.

3. Where, no matter how bulky, or ponderous the tonnage in proportion to its value, the trade is principally a descending one, and a *profile can be had for their rail-road giving equal or nearly equal facilities to the power employed in both directions.*

In this last case, rail-road transportation, more advantageous in other respects, becomes *even cheaper* than that on canals, in consequence of the fall in the line, which, in the case of the canal, would present a serious impediment by the lockage it would occasion, becoming an auxiliary to the power employed on the rail-road. There are but few cases, of course, where the *most desirable* profile has been had for a rail-road, the descent being, in most cases, either somewhat more or less than would be in theory the most advantageous. One of the most remarkable approaches to it seems to have been made in the case of the rail-road now under construction between Philadelphia and the anthracite coal district at the Schuylkill in Pennsylvania. On this work the graduation is said to vary between a level and descent of nineteen feet per mile, in favor of the downward trade. It is expected that the load of ordinary locomotive engines on it, will average from one hundred and fifty to two hundred tons net, or three hundred tons gross, travelling at the rate of from ten to twelve miles per hour, and that the whole expense to the company, of transporting coal on it, will be only fifty-three cents per ton the whole length of the rail-road, (ninety-six miles,) or little more than half the ordinary rate of freight on canals of the same length.

The above propositions can, of course, not be laid down absolutely, or without reference to the cost of the one or the other improvement; but, in the first case cited, it would require a very great difference of expense to counterbalance the decided superiority of the rail-road in point of expedition, and in the second and third cases, the item of lockage will generally enhance greatly the cost of a canal beyond that of a rail-road, and of course, turn the scale more decidedly in favor of the latter improvement.

It will be seen, from what has been said, how vague are the notions usually entertained as to the relative advantages of canals and rail-roads; advocates being constantly found of the one or the other system, without reference to the circumstances of the case, which should alone decide, where there is a choice, which is the most advisable. It would be indelicious to point out cases in which grave errors have been made in consequence of the confusion of ideas which has prevailed on this subject. Such cases, if the principles which have been laid down are correct, will readily occur to our readers, and we are probably indebted to the fact above mentioned,—the comparatively few cases in which canals are feasible in America,—that more mistakes have not hitherto been committed.

But supposing the proper description of improvement to be adopted, it may be executed on a plan incommensurate, or more than commensurate

with its objects. In the way of canals, the Union canal in Pennsylvania, and the Chesapeake and Ohio canal, are examples of opposite errors on this subject, it being now generally conceded, that the former, had it been constructed of larger section, and with larger locks, so as to have admitted of the passage of such boats as are used on the Schuylkill and Susquehanna canals, could not have failed to have been a productive work, whilst the dimensions of the Chesapeake and Ohio canal seem not to have been warranted by any trade to be anticipated on it. To make a double track rail-road where a single track rail-road is sufficient, is evidently an equally grave error; but not more so than others which may arise in works of this description, from inattention to their objects and the best means of attaining them. A few words will be sufficient to show what serious mistakes may be committed on this head.

It has been above observed, that short ascending and descending grades present no serious impediment, at high velocities, to the most valuable application of locomotive power. They are, consequently, not seriously objectionable on rail-roads for passenger transportation exclusively, on which high velocities will always be aimed at, and where the whole adhesion of the engine is not required. It is otherwise, however, on rail-roads designed for freight. On these it is most essential that the company should be able to transport cheaply, and this, in rail-road transportation, is only to be effected by carrying heavy loads at slow velocities. Now, at very reduced rates of speed, the limit to the useful effect of the engine is its adhesion, and the load which this will admit of its taking becomes diminished, therefore, precisely as the maximum grade of the road increases, whether this be a longer or shorter one.

This being the case, it follows, that on roads destined for the transportation of freights, a much greater expense is justifiable to avoid undulations or to diminish the grades of the roads, where ascents and descents are unavoidable, than on roads destined for passengers. On these last, undulations not exceeding twelve or fifteen feet per mile would be scarcely an objection; whilst on roads designed for the transportation of freight at low velocities, they would almost diminish the load conveyed one half.

In these last, however, the expense which is justifiable to improve the grades of the road, must be materially influenced by the amount of trade to be anticipated on it. If this is but limited, it is, of course, better that the road should be less perfect, and cost of transportation in consequence enhanced, than that an increased first cost, more than commensurate with the object, should be incurred in reducing it; and, on the other hand, the largest outlay may properly be incurred in improving the profile of a rail-road, in a case where the trade to be accommodated is of proportionate magnitude. Giving to these considerations their proper weight, it will be seen of how much importance it is that engineers, however well informed in the science and practice of their profession, should be also men of discriminating minds and sound judgment. Their employers are otherwise exposed to the greatest losses, not from a deficiency in their knowledge, but a misapplication of the resources of their profession, the error being equally great to construct an improvement inade-

quate, or more than adequate, or superior or inferior in character, to what its objects may justify.

The *exposé* of the Chevalier de Gerstner gives some statistical views in relation to the rail-roads of our country, which may be interesting to most of our readers. After having made a tour of inspection over most of the lines, in the course of which he was received with the greatest kindness by the presidents, directors, and engineers of the different works, who, he mentions, not only gave him their printed reports, but laid before him with the greatest liberality their books and accounts, in order that he might have every kind of information, he gives the following as the result of his examination:

"According," says he, "to the facts collected during my travels since my arrival in New York, there are now, over three thousand miles of rail-roads completed and in operation in the United States: four hundred and twenty-five locomotives, of which the greatest number were made in the country, run on the several rail-roads; and I believe that up to the end of 1839 the length of rail-roads in the United States may amount to four hundred thousand one hundred miles. The capital expended on the rail-roads now in operation is about sixty millions of dollars, or at an average of twenty thousand dollars per mile, for which sum the rail-roads, with the buildings, have been constructed, and the necessary locomotives and cars bought.

"Several rail-roads have been undertaken with insufficient means, and the shareholders found themselves under the necessity of employing the income of the first years in building engine houses, &c., and purchasing locomotives and cars. In consequence of this, the shareholders got during that time no dividend, but the rail-road still yielded a good income. Other rail-roads, when finished, paid from five to ten per cent. income to the stockholders. Others have not yet paid any dividend for want of a sufficient number of passengers and freight. The average result of the rail-roads now in operation in the United States is, that they give a yearly interest of five and a half per cent. on the capital invested. This result may be regarded as very satisfactory, because the greatest part of the lines have only been a few years in operation.

"In all lines, there is a yearly increase of at least fifteen to twenty per cent. in the gross income, so that even those lines which do not pay now will give in a few years a handsome dividend. Accordingly to these statements, based on the communications collected in this country, I have no doubt that the large capital invested in rail-roads in the United States will not only produce an incalculable benefit to the country, but also pay the shareholders a handsome dividend, which, under good management, by the constant progress of population and trade, must likewise from year to year increase."

The above opinions, founded on the careful examinations made by the Chevalier de Gerstner, are certainly calculated to give great confidence in the investments hitherto made in rail-roads in our country. If the average net profits accruing on the whole capital stock invested in them has been already five and a half per cent., even though it has been necessary in many cases to appropriate it to improving the rail-roads, building engine

houses, etc., and purchasing locomotives and cars, it is a proof that most of the rail-roads so far undertaken are valuable lines and judicious undertakings. It is no doubt, in some cases, inconvenient to the stockholders of such of them as are obliged to appropriate their receipts towards carrying out their original scheme, or to extensions of it, to be deprived temporarily of their dividends, and this measure must of course have the effect of depressing the shares of such of the companies as may resort to it. The course is, however, obviously the proper one, where an increasing trade and travel on a rail-road calls for increased accommodation on it, the means for which cannot be found without an issue of certificates of stock or bonds of the company at a serious sacrifice. Pursuing such a policy, the rail-road companies whose business is increasing must be placed at the earliest period on a solid and secure foundation, and the stockholders, when their improvements have been perfected and fully equipped with motive power, be secured steady and permanent dividends, and much better returns than could have been obtained on any other plan.

OBSERVATIONS UPON THE METHOD OF GROWING APPLE AND PEAR TREES BY GRAFTING UPON THE ROOTS.

From the Magazine of Horticulture.

Among the most valuable hints which have recently come under my notice, I consider none of more importance than those advanced by your correspondent, Mr. Teschemacher, and so ably responded to by yourself, on a free communication among gardeners. Gardeners, of all other classes of men, ought to be the last to aim at concealment, in any improvement which they may effect. Mystery is a word which ought to be banished from the gardeners' vocabulary. Horticulture embraces a range so wide, and minutiae so intricate, that, without a free communication among its practitioners and amateurs, the most accurate observer and persevering gardener could, from his own experience, attain but a faint knowledge of a business whose branches are so multifarious, and where the routine of operations embrace so wide a field. Upon this impression, I beg leave to communicate, through the medium of your valuable pages, a system of growing fruit trees, which, although not possessing novelty, is certainly not so extensively known as its merits deserve.

Grafting on the roots of apple and pear trees has long been partially practised; but I question if there are many nurserymen who have carried this to any great extent. I have had various opportunities of testing the practice, and I am perfectly satisfied of its efficacy. The stocks for performing the operation in a proper manner, ought to be only a year old. If they have been grown in a deep free soil, (which, for this method, is absolutely necessary,) they will have roots from six inches to a foot in length, of a fusiform shape, and of a sufficient thickness to receive a scion. In the fall they are taken up and laid in by the heels, in a cellar or other convenient place, until required. A quantity of scions is selected at the same time, which must be carefully assorted and properly labelled: these may likewise be placed in a cellar in

sand, or, failing a good cellar, dig a pit about six feet deep, in a dry situation, place the scions in an upright position, covering them nearly to the top with light soil or sand; place boards over the surface of the pit, leaving a vacuum of three or four feet between the scions and the boards, over which a sufficient quantity of soil is to be put; then cover the whole with rank litter, or such other substance as will prevent the frost from penetrating through the soil; this will also ensure an easy access to the scions when required.

In the month of February, if there is much grafting to be performed, operations may be commenced. The woody part of the stock is cut entirely away, and the root only used, which must be cut into lengths of three or four inches, one root yielding frequently three or four stocks. Grafting is performed in the usual manner, and when the operation is finished, they are placed in shallow boxes, over a layer of rich, light soil, burying the whole grafted part under ground; they are put in rows across the box, as thick as they can be placed beside each other; after the first row is properly placed, put about two inches of the soil as a separation between it and the succeeding row, and so on until the box is filled. Several sorts may be placed in the same box, only let each sort be perfectly distinct, and regularly named. When the box is filled, it must be placed in a shaded part of the green-house,* not exposed too much to the sun's rays,—on the back shelves, or under the stages will answer very well for some time, say until the middle of April, when they must be gradually inured to the light and air, until finally planted in the usual manner in the open ground, in the month of May. A perfect union will have taken place, and shoots of those grafted in February will have elongated from three and four to six inches.

The benefits derived from this system must be perfectly obvious. The grafting is performed at a season when little else can be done; the trees are much handsomer than those grafted in the usual manner, and the time occupied in planting out is very trifling, being planted with a common dibble; a good hand will plant several thousand in a day. I have known a nurseryman in this state graft above one hundred thousand apple trees in a season, and in two years they were handsome saleable trees.

Yours, very respectfully,

ALEXANDER GORDON.

June 21, 1840.

METHOD OF CROPPING ONE QUARTER OF AN ACRE, AS PRACTISED BY L. VAUGHAN, WILLIAMSBURG, L. I.

From the Magazine of Horticulture.

Being but a tyro in the cultivation of mother earth, I shall confine my reply to your call to facts, and leave effects to my seniors. You think the quantity produced from one fourth of an acre, large; yet, I now see, I could have made it larger.

1839.—Made hills for egg plants, in each of which I deposited half a bushel old horse-manure—labelled the hills to find them again.

* A common frame will answer where there is no green-house, only it will be necessary to shade with mats during the heat of the day, and also to cover them during cold nights.

Feb. 24.—Planted, this day, broad Windsor beans over the hills prepared for egg plants;—planted over the broad beans, spinach, radish, cress, and lettuce, all of which did very well, and were off the ground before the beans required hoeing. The beans grew to their usual size, but were not so prolific as they are in England.

From May 11th to 20th, turned out egg plants from pots into the prepared hills, amidst the broad beans. The beans were off the ground from the 15th to the 20th of June, and were a protection to the egg plants from the severe storms and cold weather of 28th May to 5th June. About the middle of August, sowed turnips, in drills, between the eggs, and some of them made very fair roots.

March 7th.—Prepared hills four feet apart for tomatoes and Lima beans, with half a bushel of old horse manure in each; labelled the hills to find them again; planted peas in drills north and south, close by the hills for tomatoes and beans.

April 22 to May 10.—Turned out tomatoes from pots into the prepared hills by the peas. I placed a pole in each hill for tomatoes and Lima beans, at the time of making the hill, and tied the tomato to the pole as you would a dahlia. Planted Lima beans under a sash, on the 27th of April, and transplanted them into the hills by the peas on the 14th of May. The peas were of great service to the beans and tomatoes during the cold weather and storms above alluded to; the peas were off the ground from the 10th to the 20th of June. In hoeing the Lima beans and tomatoes, I trenched between them for celery! which I transplanted from its nursery bed the first week in August. The Lima beans were off the ground from the 1st to the 10th of September. I think the beans were decidedly favorable to it for the first fifteen to twenty days. I have never found the Lima bean to grow, or even ripen, much after the 10th of September. The celery between the rows of tomatoes was very poor, as I found it impossible to confine the tomatoes to the poles, and they shaded it too much.

When gathering my vegetables, I selected those nearest the second crop, to give it the benefit of all the light and air I could. I kept constantly growing in pots, melons, corn, cabbages, &c., and the moment I cleared the ground of even one hill of corn and potatoes, or any thing else, a pot of some other vegetable was turned into its place.

No one must attempt the three crops without good ground made better by rich old manure. I have this day tomatoes on my vines as large as a pigeon's egg; melons, egg plants, &c., equally as forward. My early cedo mulli peas are all off the ground to day, and late melons from pots take their place. Some of my early dahlias blossomed last week, the flowers large, and colors as brilliant as those later in the season.

Yours, truly, L. VAUGHAN.
Williamsburg, L. I., June, 1840.

PROPER REGARD TO, AND MANAGEMENT OF SLAVES.

From the Carolina Planter.

Fairfield District, July 2, 1840.

Dr. R. W. Gibbs—I have read with much interest your valuable journal ever since its first ap-

pearance, and find myself more and more pleased with it, from the fact that much useful knowledge may be culled from it, and particularly by inexperienced young planters. And many valuable hints are conveyed through its columns, which would otherwise lie dormant and useless, and perish with their originator—a state of things much to be regretted where so much information upon small as well as larger matters is requisite in the multifarious duties of the planter and husbandman.

While others, abundantly more competent than myself, are discussing the more weighty matters, and not only endeavoring, but succeeding in elevating the character of the tillers of the soil, the mainspring of all occupations—I feel a disposition to throw in my mite upon a subject too much neglected, but one of infinite magnitude, and pregnant with evil; so much so, that inadequate as I may feel myself to be I have no doubt but that I may cause the guilty to blush—I mean a proper regard to, and management of slaves.

There are, in all concerns of life, extremes much to be regretted and avoided; and to an alarming extent is this the case in not using a proper, close, uncompromising discipline over negroes, keeping in mind at all times the line of distinction between master and servant, and prohibiting entirely the association of any and all white persons from intercourse with them who do not observe the same rule rigidly, and all innovations to said rule should be fearlessly, instantly, and promptly punished. Upon the other hand, however, there are many, very many weighty responsibilities due from masters to slaves—and it is a source of just satisfaction to the exalted citizens of our own state, and the south generally, to know that many of these obligations they daily acquit themselves of most honorably, as in the daily allowance of food, clothing, and comfortable cabins—and of at least paramount importance, only a moderate service is required, all of which, in the eye of the humane, or even judicious owner, are necessary, scrupulously so, for his own advancement, if not to satisfy the risings of a benevolent heart—which is, with but few exceptions, the prompter to good deeds. But there are exceptions to this rule of conduct, which deserve our attention and action, from its source being diametrically opposed to both the laws of God, and man, and to reason, common sense, and self-interest. The more to be regretted, too, from the fact that such inhuman owners of slaves frequently perturb whole neighborhoods, and inflict, measurably, disgrace upon whole districts, yea, states: an instance in confirmation of my position, I will offer. A gentleman is travelling through Fairfield district, and discovers, on the Sabbath or Lord's day, 20 or 30 negroes in the fields in the performance of their daily labor, cotton gins, screws, and wagons, all running—he is a perfect stranger, knows no one, and of course knows not who to blame. In mixed company this may become the subject of conversation, and a benevolent, humane slaveholder may chance to have his feelings tortured innocently; but being a resident of the district in question, cannot deny it, to his sorrow, and to the shame of the perpetrator. And worst of all, it exerts a powerful and baneful influence upon the morals of the young and rising generation, and should be suppressed at all hazards.

I regret to say that I know large slaveholders and otherwise honorable men, who, I believe, feed

and clothe well, but who do exact too rigidly from their slaves—as the performance of all errands is done at night, such as the errands to the store, blacksmith's shop; and with some the labor of packing cotton, &c., and as before remarked, they exact from them the Sabbath, the day given them by their Maker for the best and wisest of purposes, for religious observance, and in which they may recover from the exhaustion and fatigue incurred from 6 days of labor in a hot, melting sun. The penal statutes of our state should be enforced, but a mistaken delicacy interferes, and they escape the laws: but most certainly they are a mock, a by-word and reproach, and justly deserve the indignation of all who treat their slaves as their great Author designs, neither deserving the name of planter, patriot, or statesman, and should never be nor indeed are they esteemed by those. But standing guilty before that tribunal which has said, "Servants be subject to your masters with all fear, not only to the good and gentle, but also to the forward; and also, masters give unto your servants that which is just and equal, knowing that ye also have a Master in heaven."

My strictures, Mr. Editor, may be thought to cut too close, but should the shoe fit let it be worn. You may, however, think them out of place, if so, please to exercise your own discretion in their use, and the writer will be satisfied.

A YOUNG PLANTER.

JOURNAL OF A RECENT VISIT TO THE PRINCIPAL VINEYARDS OF SPAIN AND FRANCE;

Giving a minute account of the different methods pursued in the cultivation of the vine and the manufacture of wine, with a catalogue of the different varieties of grape; an attempt to calculate the profits of cultivating the vine; an estimate of the profits of Malaga fruits, &c.*

By James Busby, esq.

Preface by the editor of the first London edition.

It is singular that among the many books on wines now existing, there is scarcely one to which a person in search of sound practical information can profitably refer. These books appear to have been chiefly written by amateurs and theorists, whose acquaintance with their subject had either been entirely formed over their "wine and walnuts," or who, with but slight reference to facts, had taken their opinions on trust from the conjectures of those who had preceded them. But the conjectures and speculations of persons who have never visited a wine country, or who have only

hurried through one in the diligence, are alike barren of information and entertainment; and thus it often happens that treatises upon wines are about the *driest* of all reading. They have neither the grace of fiction nor the utility of truth.

The little volume here presented to the public we have no hesitation in ranking in a very different class. The author, possessing an intelligent and inquiring mind, and carrying along with him a distinct and practical purpose, pursues his way over a tract of the finest wine country in Europe, and notes down his observations and the result of his inquiries, in a plain, brief, intelligible and interesting manner. If wine countries were often visited in this way, and only facts judiciously detailed, we should not find, as we do at present, books on wines to be for the most part mere perpetuations of error; but each writer, adding his careful gleanings of facts to those of his predecessors, all the information on this topic which is of public interest or utility would speedily be accumulated.

It is only necessary to add, that besides the author's valuable and accurate remarks on the cultivation and manufacture of wines, the journal contains some useful observations on the culture of the olive and other fruits, and on Spanish and French agriculture generally. The work, as will be seen by the author's preface, was originally published in New South Wales, where Mr. Busby is now settled. The present edition is, therefore, a reprint, with the view of introducing the book to a more extended circle of readers.

London, June 23, 1834.

Tables of Spanish Weights, Measures, and Moneys.

WEIGHTS.	
4 Arrobas	1 Quintal.
1 Quintal	102½ lbs. English.
MEASURES.	
6 Arrobas mayores	25 galls. English old measure.
1 Butt of wine contains	30 Arrobas mayores.
18 Arrobas menores	39 galls. Eng. old measure.
1 Pipe of oil contains	34 Arrobas menores.
25 Arrobas mayores	32 Arrobas menores.
5 Fanegas	1 Quarter English.
27 Varas of Castile	25 Yards English.
1 Aranzada	1 Acre English.

MONEYS.	
Piastre	1 hard dollar.
20 Reals Vellon	
10½ Reals Plate	

In this edition, the author's calculations in British currency have been reduced to United States currency, at \$4 75 the pound sterling.

JOURNAL, &c.

Monday, 26th September, 1831.—Having embarked at London on the 6th of the present month, I this day landed at Cadiz. I had here the good fortune to meet with Dr. Wilson, an English gentleman, to whom I had brought a letter of introduction; and as he was about to return to the house of his brother, an extensive wine merchant of *Xeres de la Frontera*, I accepted his invitation to accompany him to that place, on Wednesday next.

28th September.—At three o'clock this day, I accordingly joined Dr. Wilson in hiring a passage-

* From the time this work first came into our possession it was designed to reprint the whole, in the Farmers' Register, as soon as so much spare space could be allowed. We had at first thought merely to extract the parts relating to vines and wine, omitting all other connecting passages on other subjects. But by such omissions, not much even in space would have been gained, and more would have been lost in the interest of the Journal, and its value as an entire work. It is therefore given entire, with the exception of the author's preface, and the appendix.—Ed. F. R.

boat to cross the bay of Cadiz, in order to avoid the delay of the common ferry-boat. Port St. Mary's, the town at which we disembarked, is chiefly occupied by persons engaged in the wine trade, and from this place the sherry wines are shipped. It took an hour and a half to cross the bay, and another half hour to engage a *calesa*, and forward our baggage; after which we proceeded on our journey. Four or five miles out of Port St. Mary's, the country consists of a coarse barren sandstone, partially covered with gravel, excepting on the banks of the river, which have the appearance of great fertility. We stopped at a *Venta*, or public house, to obtain a glass of the wine called *Manzanilla*, the *vin du pays* of the district, which Dr. Wilson assures me is preferred to all other wines by people of all ranks in the country; it is not known in the cellars of the English merchants, but is a light, pleasant beverage, having at the same time a mellowness and flavor, which I have no doubt would, after a little habit, procure for it the preference even of those who would find it insipid at the first trial.

The twilight was far advanced as we entered the wine district; at one place we could distinguish a man with a musket who had been posted to watch the grapes, it being now the middle of the vintage. At half past seven, we entered the town of Xeres, which is reckoned one of the richest, if not the very richest in Spain, in proportion to its population, and which owes its wealth entirely to the valuable wines produced in its vicinity.

Friday, 30 September.—A violent storm of wind and rain made it impossible to quit the house yesterday, and though the rain continued to fall at intervals to-day, I managed to visit, in company with Dr. Wilson, the cellars of the house of James Gordon and Company. The extent of these cellars is quite immense: the extreme length of the largest being 110 Spanish *varas*, about 306 English feet, and the breadth 222 feet; the roof is supported by rows of massive square columns of mason work; and although the whole cellar is not of the above length or breadth, the principal division of the building being only 200 by 150 feet, yet, with its various adjuncts, the whole extent of the cellar is equal to the dimensions first stated. Messrs. Gordon and Company have also another very extensive cellar, though not equal to this in dimensions. Their ordinary stock of wine is said to be 4000 butts: this is kept in casks of various sizes, containing from one to four butts. These casks are ranged in regular rows; in some parts of the cellar, to the height of four tiers. They are called *soleras*, and are always retained in the cellars. They contain wines of various qualities and ages—from one to fifty years. The wine merchants of Xeres never exhaust their stock of finest and oldest wine. According to the price at which the wine expedited to the market is intended to be sold, it contains a larger or smaller proportion of old wine. But it is only in wines of a very high price, that even a small portion of their finest wines is mixed. What is withdrawn from the oldest and finest casks is made up from the casks which approach them nearest in age and quality, and these are again replenished from the next in age and quality to them. Thus, a cask of wine, said to be fifty years old, may contain a portion of the vintages of thirty or forty seasons.

The more respectable of the wine merchants of

Xeres never ship wine for England till it has attained the age of two years; that is, till the bulk of the wine has attained that age. But according to the price it is proposed to bring, it contains a larger or smaller mixture of a more or less expensive wine. The higher qualities of sherry are made up of wine the bulk of which is from three to five years old, and this is also mixed in various proportions with older wines. Thus, from the gradual mixture of wines of various ages, no wine can be farther from what may be called a *natural wine* than sherry. But besides giving the wines, as they are prepared for the market, mellowness and richness, by the addition of older wines, there is a very dry kind of sherry called *Amontillado*, or *Montillado*, which abounds in the peculiar nutty flavor that distinguishes sherries, and which is frequently added when that is deficient. Being very light in color, it is also used to reduce the color of sherries, which are too high; and when on the other hand, color is required, the deficiency is made good by the mixture of *boiled wine*, or rather, of *boiled must*.

The lowest priced sherries are in general the growth of Port St. Mary's or San Lucar, two districts within ten miles of Xeres; or they are brought round from Malaga to Port St. Mary's, and thence transhipped for England under the name of sherry, perhaps after having been landed and mixed with other wines to give them the qualities in which they are deficient. All these lower priced wines are largely mixed with brandy, being intended for the consumption of a class of people who are unable to judge of any quality in wine but its strength. But brandy is added in very small proportions to the good wines; never in greater quantities than four or five per cent. while they remain in the cellar, and frequently not at all, unless the wine should become *scuddy* or *mothery*; and thus the finest wines are frequently entirely free from it; but on their shipment, a small dose of brandy is considered absolutely necessary, even to fine wines, to make them bear the voyage, as it is said; but, in reality, because strength is one of the first qualities looked for by the consumers. When wines become *mothery* in the London docks, they send them back to be cured; and this curing consists of nothing more than an addition of brandy: perhaps, indeed, it is chiefly effected by the motion of the voyage. The *soleras*, or store casks, in which the wine is kept, are left with a void of 1-15th of their contents, and the access of the air is admitted through a loose wooden bung, which merely covers without closing the aperture.

The exporters purchase the wine from the growers generally when it is one year old. The cellars throughout Xeres are very numerous, and are the most extensive buildings in the town. The wine constitutes the chief wealth of the inhabitants.

Saturday, 1st October.—The weather being more settled, about mid-day I rode out in company with Dr. Wilson, taking the road to Madrid, in a northerly direction from Xeres. The road, immediately after quitting the town, was execrable, as well as the streets themselves; but after passing the limits of the town's administration, and coming on to the road supported by the government, it was much better. The ground we first passed is a sandy loam on both sides, and near the town it was cultivated with great care for vegetables, every farm having its *norria*, or water wheel, to irri-

gate the grounds. We saw them planting garlic in small square divisions. The plants were placed on a bank which formed the square, about three inches above the surface. The squares were separated by channels for conveying the water, an interval being left at one of the corners of each square to admit the water to the interior, which was five or six feet in diameter. Some of the squares had also rows of plants on similar situations within them. In this, or a similar manner, all their vegetables are irrigated; and no one would think of laying out a garden unless on a spot where it could be continually irrigated. About a mile from the town we struck off into a plantation of olives; few of the trees, however, contained any considerable quantity, and some were altogether without fruit. Such olives as we pulled were universally rotten. I was afterwards told, by Mr. Gordon, that all olives are rotten this year, and that this is invariably the case every second year. A little further, we saw a new plantation on the opposite side of the road, and luckily found a peasant under a miserable shed of leaves and straw. To our questions respecting the olives, he informed us that the plants bear a little fruit even the first year; but in the second and third years they bear a considerable crop, in proportion to their size. Some of what we saw had been eighteen months planted, some only six months. The former appeared healthy young trees, covered with a considerable quantity of foliage; the latter had only a few slender shoots, and some of them indeed stood in their original nakedness. These olive plants were nothing else than large limbs of old trees, from eight to ten feet in length, and from two to three inches in diameter. They are sunk about four or five feet into the ground; and the part of the plant above ground is covered, during the first summer, with a cone of earth or clay, to the height of from two to three feet. After leaving this young plantation, we struck off to the left, and made for the nearest vineyard across the fields. In consequence of the very heavy rains during the two preceding days, most of the vineyards were deserted; the people in this part of the country almost universally living in the towns. We found no person in the cellar of the first vineyard we entered; but in the next there were two idle peasants lounging about the door of the cellar. Giving our horses to the younger, we entered into conversation with the elder *vinador*. The extent of the vineyard, he said, was 40 *aranzadas*, about 38½ English acres. He said they usually made from 66 to 68 butts of wine; but this year they had only made 55, when the rains commenced, and he doubted now whether they could make any more. Sixty-seven butts from 38½ acres, is equal to 223 gallons, *old measure*, per English acre. The soil was of the description called *Albariza*, which produces the finest wines.

The *vinador* stated, that in replanting a part of the vineyard, they had dug it to the depth of a *vara*, or Spanish yard—about 33½ English inches; but on proceeding to the spot where they had been trenched, and stepping into the trench, I found the surface only came to my knee. From twelve inches below the surface the soil was quite compact, but appeared to differ from the surface soil only in not having been exposed to the atmosphere. According to *Rozas Clementi*, a Spanish writer upon the vines of Andalusia, the *albariza* soils contain

generally about 70 per cent. of carbonate of lime, the remainder of the compound being chiefly alumina, with a very small portion of silica, and occasionally a little magnesia; but in some places it is almost pure carbonate of lime. This soil absorbs every drop of moisture which falls upon it, and never cracks or opens in the greatest heats of summer. I paced over the piece of ground which had been trenched, and found it 45 by 16 paces, about 24 perches. This, he said, had occupied ten men for four days.

The distance of the plants in this vineyard was about five feet each way. Some of the vines were very old and appeared to be in very bad condition. The *vinador* said they were renewing them gradually, and thus the vineyard was not all in full bearing. Some plants, which were only six years old, appeared extremely vigorous; and as the grapes had not been gathered from a part of them, we counted the bunches on a considerable number, and found them to average eight or nine; and from our own estimate, and that of the *vinador*, the whole weight of the fruit might be from 14 to 16 lbs. on each. All the new varieties, he said, were of the variety called *Uva de Rey*. There was a dunghill of fresh horse dung collected outside the vineyard; and though we were uncertain whether we understood each other's meaning, we supposed him to say, that they manured each plant annually. The plants had each from two to four mother branches, according to their strength, and had almost invariably been pruned down to one or two spurs on each.

In the cellar there were four presses, which consisted of nothing else than large wooden troughs, about eight feet square, and from twelve to fourteen inches deep. This is the general size; and each will contain at one time, as many grapes as will yield a butt of wine. A coarse wooden screw stands in the centre of the trough, which is worked by a lever not more than five feet long in all, so that each arm is only two and a half feet. In some of the casks which contained the juice that had been last pressed, we observed a vessel, like a very wide funnel, fixed into the bung hole. The object of this is to return into the cask all the froth and wine which is thrown up in the fermentation; for, in this part of Spain, all the wine is fermented in butts, with only the bung hole open. By this means all the yeast, which the French are so anxious to get rid of, is returned upon the wine, to feed it, as they say. The consequence, of course, is a renewal of the fermentation whenever there is a change of weather, or the cask is put in motion. The wine continues in the butt in which it is fermented till March, when it is racked off the lees. This is the almost universal practice of the country.

In the course of our ride we passed a flock of sheep, about 250 in number; the majority were black and short woolled. The wool is worked up into common cloth of its original color. It is worth 3 *reals vellon* (15 cents) per lb. The white sheep were of a totally different breed, with long white fleeces, more resembling hair than wool. We also saw two men on horseback, and several on foot, with a herd of cattle. The horsemen were the proprietors, who had been *mustering*. There were about three hundred in the herd, chiefly young, and all dry. The cows had little appearance of milk, and the breed was altogether bad. This,

as I was given to understand, was a fair sample of the sheep and cattle of the province. It is not lawful to enclose cornfields; nor, indeed, are any enclosures lawful, except for vineyards or gardens. As soon as the grain is off the fields, they are common property, and every one who chooses is entitled to send cattle or sheep upon them: a law which, perhaps, more than any other, strikes at the root of agricultural prosperity, and keeps the agriculture of Andalusia in its present barbarous condition.

Monday, 3d October.—Mr. James Gordon having invited Dr. Wilson and myself to visit a vineyard belonging to him, about four miles from Xeres, we accordingly started at about one o'clock; Mr. Gordon riding a *black barb*, or jennet, which he valued at £100 (\$475,) and which he said had cost him £70, (\$332 50.) We passed out of the town by this direction, as well as by every other, through hills of dung, which had been allowed to accumulate, and appeared to be considered as not worth taking farther. The road lay between immense hedges of the *cactus*, or prickly pear, and aloe, planted on the top of high banks, and making a fence which would prove a considerable impediment to the march of an army. Mr. Gordon pointed out a hedge of prickly pears two years old; and which, even though it had been on the level ground, would already prove a very tolerable fence. He is of opinion that the original plants, if properly looked after, will form a fence for forty years; and if renewed with occasional fresh plants, would last for ever.

The aloe is also much used for fencing, but is considered by Mr. Gordon as very inferior to the prickly pear, as it dies off whenever it has flowered. There is a prejudice that this plant flowers only once in a hundred years, and it is thence called the centennial aloe. The truth is, that though it is often many years in flowering, when it has once flowered it dies off for ever. If there is any part of the rural economy of the Andalusians which the settler of New South Wales could adopt with advantage, it is the hedge of prickly pears. It is not possible to imagine a more effectual fence, nor one which it would take less trouble to plant or keep in order. It is only necessary to place, at certain distances along the proposed line, a leaf, or part of a leaf, of the plant. In nineteen cases out of twenty they will take root without any further trouble; and in two years, or three at the farthest, there will be a more effectual fence than a four-railed one. The only objection to this kind of fence is the room it occupies after a few years' growth, if not pruned down: but, in New South Wales, we are not yet so much pressed for room as to make this an objection. To those who may feel inclined to adopt this recommendation it may be a useful hint. Though I was told it was scarcely possible to keep the prickly pears from growing, even by cutting the leaves into small pieces and throwing them on a dry spot, still it would be worth the trouble to place each leaf, or part of a leaf, in a spadeful of manure, both to insure its striking and its more vigorous growth.

The road to Don Jacobo's vineyard passed at first through banks of albariza, but we presently came to the *arenas*, or sandy soils, which adjoin the common of Xeres. Don Jacobo's vineyard was in this soil. His people had just recommenced

the vintage after the rain, and were now assembled to dinner; which consisted of a kind of cold soup made from water, with oil, vinegar, salt and pepper, and salads scraped down, or cut small. The more substantial part of the meal was bread, prickly pears, sweet pepper and grapes.

I here tasted some of the boiled must which is used for coloring the wine. It was literally the quintessence of the must, having been boiled down to a fifth part of its original bulk. It was as thick as treacle, and resembled it in flavor, but with a strong burned taste.

Don Jacobo Gordon's vineyard yielded him, when in a good state, from 2½ to 4 butts of wine per acre. At present it is in a course of renewal, having been ruined by the spread of a grass which sends its roots to the depth of four feet. A certain portion, which had been planted within the last five years, appeared to be in a good state of bearing; another part was only two years old. The young vines were all very healthy, and had been cut down to two or three mother branches, with one knot on each. In forming the young vines, as well as in pruning them afterwards, great care is taken to have the branches in such a direction that they will balance each other upon the stock, the latter being generally from 12 to 18 inches from the ground before the branches spring out. The object of this care is, of course, to support the bunches from the ground without the aid of props or stakes. It cost £56 (\$266) an acre to renew the plantation of this vineyard, it being necessary to trench it to the depth of four feet, in order to get out the grass. The soil, as turned up, even from that depth, was extremely sandy. The plants here, as elsewhere throughout the district, were at the distance of five feet from each other in both directions. The varieties which had been planted were the *Pedro Ximenes* and *Uca de Rey*, white, and *Tintilla*, black. Black grapes are, however, very rarely cultivated here. The different varieties were planted in distinct divisions. I observed that some of the old vines which it was intended to eradicate this season, were loaded with grapes, having been pruned to carry as many as possible. This is what the French called *charge à mort*, and the practice here was known by the name of similar import. The vines are regularly manured with any kind of dung; in general, strong stable dung: not every year, because, said Mr. Gordon's chief vinador, who accompanied us, he could not procure it. He would dung them every year if he had the means, and did not seem to consider that the quality of the wine would be affected by it. But this vineyard, as well as all others on the same kind of soil, only produced inferior wines.

The olive having been mentioned, we were shown two olives, which supported a wheel for drawing water from the well. Two posts having been required for this purpose when they were clearing the ground of some olive trees three years ago, they took two of the trunks of these, which were respectively 10 or 12 inches in diameter; they nevertheless took root, and are now covered with strong branches, affording a proof of the great facility with which the olive takes root. The vinador said that an olive would produce a crop three years after its plantation, but not a full crop till its fifth year, and would reach its greatest perfection in its tenth year. He said a plant ought

to be the limb of a tree of the thickness of a man's arm. Being asked how long it would take before a slip, such as we plant in New South Wales, would bear a crop, he appeared to consider the proposal as ridiculous, and said he thought twenty years. He did not consider the oil of young olives inferior to that of the old: the only difference in their value arises from their quantity. The olive is now cultivated in this district to the same extent as formerly, the superior attention bestowed upon it in the neighborhood of Seville having made the slovenly cultivation pursued here unprofitable. The trees are planted with considerable regularity, at the distance of 36 or 40 feet. An average crop, Don Jacobo says, "is from 1½ to 1½ arrobas," that is, from 5 to 6 English gallons each tree.

In passing through this vineyard I observed a very considerable variety of grapes, differing not only in appearance but taste; but many of those which were evidently distinct were said by the *vinador* to be the same. He would not admit that there were more than four or five kinds. I should have judged the number to be not fewer than twenty; and Mr. Cornack, a member of Mr. Wilson's house, afterwards informed me that there was at least that number of varieties in all the vineyards round Xeres, and he thought this was one cause of the excellence of the wine. On our way back to town I examined one of the *norias* which supplies Xeres with water. The well was about 40 feet in depth, and 7 in diameter. The machinery by which the water is raised is of the rudest construction. A horizontal wheel with large teeth turns a vertical one of about five feet in diameter; over this wheel passes a flat band, made of a kind of grass, to which earthen pots are attached over its whole extent. The pots go down empty at one side and come up full at the other. The water is thus raised to a cistern of sufficient elevation to send the water to the town, about a mile off. It struck me that any settler of New South Wales could construct such a piece of machinery with his own men, and even without the aid of a mechanic.

Tuesday, 4th of October.—About 10 this morning, in company with my indefatigable friend Dr. Wilson, I started to visit the vineyard of *Don Pedro Domecq* celebrated, under the name of *Machar Nudo*, for producing first-rate sherry wines. After quitting the immediate vicinity of the town, we passed over open downs, which bore the appearance of having been under crop, but without a single enclosure or landmark so far as we could observe. The downs were skirted on the left by the chalky hills (*albarizas*), covered with the vine, and carefully enclosed by hedges of the prickly pear and aloe, planted as usual on the tops, of high banks. We passed three ploughs at work, following on the same furrow. The plough is of the rudest construction, exactly similar to what are represented in those plates which exhibit the first invented implements of agriculture. There is no mouldboard, and the plough consequently makes only a series of drills, without turning a single furrow. It has only one handle, and is sometimes held in the right and sometimes in the left hand, the mules with which they generally plough being guided and driven with the other hand. As usual, when riding among vineyards, we entered the *albarizas* through a road between

steep banks and hedges—the bottom of the road being in general the compact stratum of chalk. Don Pedro's vineyard lies in a north-easterly direction from Xeres, and consists entirely of chalky hills. It was evident, on entering the enclosure, that the vines were treated with much greater care than any we had examined. The mother branches were better balanced and supported from the ground, and were regularly pruned; and not a weed or a blade of grass was to be seen among them. The immediate vicinity of the house was tastefully planted with a profusion of ornamental trees, within which was an extensive paved court, surrounded by a wall and railing; the cellars were on a much larger scale than in any of the vineyards we had before seen or passed; the house neither large nor convenient, and in great degree spoiled by some of the rooms being made the passages to a high tower which he has built to have a view of all parts of the vineyard, and which has been carried to a great height, in order to command a prospect of Cadiz, on the south-west and Seville to the north. "A certain man planted a vineyard, and hedged it round, and having digged a wine press, and built a tower, he let it out to husbandmen." Every vineyard, of any considerable extent here, has also its tower, but, in general, they are less than half the height of that of *Machar Nudo*. Mr. Domecq is a gentleman of French extraction, and speaks English fluently. We found him under the verandah of his wine cellar, and having mentioned the object of our visit, he undertook, with great readiness, to give us all the information we should ask: he answered my questions and explained his proceedings in the manner of a man who was thoroughly acquainted with his subject, and had not been accustomed to follow blindly the practices he had found established. He said he was gradually renewing his vineyards, the vines having been destroyed in many places by a very destructive insect—a small white worm, with a black head, which eats into the heart of the old stock, and destroys it; vines he said, which would have been good for 150 years were thus rendered useless—they were now 40 years old; he attributed it to injudicious pruning. It was customary to cut off the bearing branch close to the old wood; by this means the worm either obtained an entrance to the heart of the stock full grown, or was deposited in the egg, on the decayed part, and worked its way in when formed. A footing once obtained, there was no mode of getting rid of it, and the consequence was that the vines became every year more injured in health, till they were at length incapable of yielding a crop. The system which Don Pedro adopted in pruning was to leave one knot of the branch cut off, which prevented the entrance of the insect into the stock.

His mode of pruning differed from what we had previously observed: instead of leaving only one, or at most two knots on each of three or four branches as was the case in the other vineyards we had examined, he left one branch with seven or eight knots, and two others with one knot each, pruning them down alternately; he did not consider that this was burthening a young and healthy vine too much. He was in the habit of manuring his vineyards, but not each year in the same place. He considered it a disadvantage to have many varieties, and was confining his new plantations

to three or four. He said that all the varieties mentioned by *Rozas Clementi* were to be found in the vineyards of Xeres, but the proprietors were all anxious to make it be believed that their vineyards contained only the most celebrated sorts. Don Pedro Domecq's vineyard contains about 200 acres, and yields from 600 to 800 butts of wine according to the season. This year a large proportion of the grapes in his vineyards, as well as in other vineyards throughout the country, had rotted, in consequence of the season having been unusually wet. He said that in future years he should take care to prevent this result, by unleafing the vines, and allowing the rays of the sun to reach the grapes. He trenched the ground to the depth of a *vara*, (33 inches;) he said he did not consider it advantageous to go very deep, it allowed the roots to penetrate too far from the heat of the air; he did not approve of the practice usual in the country of leaving holes about the foot of the vines, for the purpose of collecting the moisture to the roots; he preferred having it all well dug over; this was done three, or even four times a year, and when first dressed in the winter after the pruning, it is turned up to the depth of 14 or 15 inches.

On entering his cellar, or rather pressing-room, we found the laborers at their dinner. Bread seemed here, as elsewhere, the chief article of their diet. There was also abundance of prickly pears and grapes. We passed to the cellar where the new-made wine was stowed, and tasted it in its various states. The wine of a fortnight old was still very sweet, although the fermentation was now barely sensible. We also tasted the sweet wine of the same age, made from the *Pedro Ximenes* grape, and we conceived it to be barely possible for any thing to be more luscious, although we were informed that in a dry season it is much richer. He said he had about 200 butts of the sweet wine, and wished it were all of that quality, it was so useful in mixing with his purchased wine for exportation. We observed some casks marked *podrida*, as being made from rotten grapes, and asked if there was not great danger of that wine turning out ill. He replied yes, by the ordinary management of the country, but he had adopted a different system of treatment. He said, that instead of putting a funnel into the bung-hole of the cask to prevent the scum from escaping, no sooner was the violence of the fermentation over, than he filled up the cask, in order that it might work over and escape. He also racked off his wine into clean casks at the end of two months, or even a shorter period, instead of allowing it to remain in the cask in which it was fermented till March or April, as was the general custom. He says that brandy is added to the sherry wines, chiefly on account of the taste of the English, who are its principal consumers; but it is also useful in preventing scuddiness, and curing it when it has taken place. Don Pedro perfectly agreed in an opinion which I offered, that if wines were made with sound grapes only, and more perfectly fermented, this scuddiness would never occur. I represented to him the advantage of large vats for fermenting the wine. He acknowledged the probability of a more perfect fermentation taking place in large vats, and of the wine being the earlier ready for the market in consequence; but objected, that where there were 700 or 800 butts to make, it

would require so great a number of vats, that it would not be practicable. I explained to him that the fermentation would be so much sooner over in consequence of its violence, that the wine might be in general drawn off into casks after five or six days, and thus the same vats might be used many times; for in consequence of the care that is observed in the vineyards which yield sherry, to have all the grapes thoroughly ripe, the vintage will frequently continue for six weeks, commencing about the middle of September, and seldom being completed till the end of October. In the vineyards yielding the common wines this is not the case; when the majority of the grapes are ripe, they gather the whole, and their vintage, is over in 8 or 10 days. My observation, as to the shortness of the time it would be requisite to keep the wine in the vats, appeared to get over his difficulty; and from what he said, I think it likely that he will not allow another vintage to pass without giving them a trial. He said he was sensible of the advantage of *sulphuring* wine, but that it was difficult to prevent the taste from remaining: and that it sometimes happened that the English merchant would not be persuaded that there was no taste of sulphur, even when none had been used. He had got M'Culloch's book, and was aware of the qualities of the sulphate of potash, which that writer so strongly recommends. On returning from the cellar to the pressing-room we found the presses at work. There were eight troughs, similar in shape and dimensions to those formerly described, each with its wooden screw in the centre. A large quantity of grapes being heaped up in one part of the trough, they commence by strewing upon them as much powdered gypsum, or sulphate of lime, as a man can take up with both hands. A portion of the grapes are then spread over the bottom of the remainder of the trough, upon which the men jump with great violence, having wooden shoes, with nails to prevent their slipping. After the greater part of the grapes are pretty well broken, they are piled up round the screw, and a flat band, made of a kind of grass, is wound round the pile, commencing at the bottom, the broken grapes being heaped and pressed in as the band is wrapped higher and higher, till they are all compressed into it. They then commence working the screw, and the *must* flows with great rapidity. The bottoms of the troughs are elevated about 2½ feet above the floor of the cellar, and each has two spouts, under which tubs are placed, and jars in the tubs; and as the jars are filled, they are carried away and emptied into the butts. When the whole operation is completed, the bulk of the husks or skins is not more than one sixth or one seventh of what the grapes appeared when first placed in the troughs. This is almost the universal practice of the country; but some persons pour a jar of water over the grapes at the same time that they strew the gypsum upon them. And it is usual to add water to the skins and husks, and then to tread and press them again. This yields an inferior wine, but is generally added in the state of *must* to the produce of the first pressing. It has been observed, that in very dry seasons, the *agua pisa*, as this is called, is almost equal to the *yemas*, or first running. Don Pedro's cellar contained eight of these presses, all of which were at work; but he was erecting a press upon scientific principles,

the plan of which he had procured from France. I did not wait to examine its construction. The vintagers brought in the grapes as they gathered them, in buckets or pails, which they carried upon their shoulders. I was astonished to observe that so little attention was paid to the quality of the grapes put into the press. I had previously observed in every mule or ass load, which I had seen conveying grapes from the vineyard towards the town, that a large proportion was decayed, but I thought it probable that some selection would be made before pressing. Here, however, I observed that three-fourths of the grapes had burst in consequence of the rain; and, perhaps, from one-third to one-half appeared to be far advanced towards *putrefaction*, but the *must* that ran from them was nevertheless perfectly sweet. Observing so little selection in a vineyard where more care was taken than in any other we had seen, and some science really indicated by the proprietor, I concluded that nothing was more common than for the grapes to be in a state of decay when the wine was made. It was evident that if baskets had been employed in which to gather the grapes, a great proportion of the juice would have been lost; but there was an immense waste of labor in each vintager bringing what he had gathered the whole way to the cellar. If Don Pedro had left roads for a cart, or even paths for a mule through his vineyard, he might have brought his grapes to the press with half the manual labor he now employs. Having an engagement to dine with Don Jacobo Gordon at 3 o'clock, we quitted Don Pedro Domecq's vineyard sooner than I would have wished to part with its intelligent proprietor. He is the largest holder of wine in Xeres, and exports more than any other merchant.

Wednesday, 5th October.—At seven this morning I took leave of my hospitable and very attentive friends at *Xeres de la Frontera*; Doctor Wilson having engaged, at the proper season, to procure and send me to London cuttings of all the varieties of vines cultivated in that neighborhood. I had engaged a *calesa*, a wretched sort of gig, to convey me to San Lucar, there to join the steamboat for Seville, this being considered my best route to Malaga, whither I now proposed to make the best of my way. We had only proceeded three or four miles, when one of the wheels became loosened, and the *calesera* had no means of repairing the damage, there was nothing, therefore, for it but to return. Accompanied by Dr. Wilson, I rode out in a different direction from any we had previously taken, and stopped to examine more particularly one of the *norias* which supply Xeres with water. We entered a stable, and ascended to the loft where the mules work; the ascent is without steps, to allow the mules to go up and down. The elevation of this loft was ten feet; the mules were not at work, and the driver lighted a piece of rope and let it down into the well to show us its depth; the well is about seven feet in diameter, and 25 varas (about 70 feet) to the water, which has a depth of 11 feet, making the whole depth of the well about 80 feet.

The circle round which the mule treads is 30 to 35 feet in diameter; the horizontal wheel is 10 feet; the vertical wheel 8. They act upon each other by a series of teeth, which are merely pegs fixed to the outside of the wheel. The teeth pro-

jecting from the horizontal wheel were ten inches; those from the vertical wheel 8 inches in length. The horizontal wheel is turned by a lever attached to the top of the beam, about 10 or 11 feet in height, and falling at an angle to the height of the shoulders of the mule. The circular bands, to which are attached the earthen jars, are made of a kind of grass which is in general use for that purpose. The jars are separate about six or seven inches, and are very deep in proportion to their width; they are fixed between the two bands, by cords passing round the middle, (where their girth is least,) and near the top; the whole length of the circular bands is, of course, twice the depth of the well, the number of the pots is 37, and they are about four feet apart. When the wheel is set in motion, they descend empty on one side, and passing through the water, rise nearly full on the other side of the well; there are small holes in the bottom of the jars, to allow the air to escape when they enter the water, there is, consequently, a constant leakage from jar to jar as they ascend. Each of the jars delivers from four to five English pints at each revolution of the wheel (of ropes.) The trough, into which they are emptied as the wheel turns, is on a level with its centre. When there is a greater demand for water in the very dry season, they double the number of pots, putting one between each of those now in use, and yoking a second mule. They must double the quantity of water delivered in the same time. The water is conveyed to the two in earthen pipes, and sold from the cistern to which it flows, the *norias* being all private property.

Having finished our examination of the *noria*, we proceeded to the adjoining vineyard, where half a dozen men were employed in gathering the grapes. This vineyard is situated in what are called the *arenas*, (sands;) the soil is a light sandy loam, and though surrounded by hills of chalk did not appear on trial to contain the smallest portion of calcareous matter.

The soil seemed capable of supporting a more vigorous vegetation than at any place he had visited, and the vines were pruned accordingly. On each vine there was at least one long branch, containing from eight to ten knots, and from two to four spurs, with one or two knots each. On some vines there were two branches, one containing eight or ten knots, the other four or five, beside three or four spurs, with one or two knots each. On one or two vines, which seemed very heavily charged, I counted twelve knots on one branch, and seven spurs; the crop was in proportion, many of the vines producing twenty bunches and upwards. The average weight of fruit on each vine could not be less than from 25 to 30 lbs. The *vinador* said, the extent of the vineyard was ten aranzadas, (9 acres, 2 roods, 10 perches;) the produce varied according to the season, from forty to fifty butts; forty-five butts is about six hundred gallons, old measure, for each English acre. The other vineyards in the *arenas* seemed to be pruned in the same manner, and to be fully as heavily charged with fruit. The *vinador* said the wine was of very good quality. The grapes were chiefly the variety called *Uva de Rey*; but there are also a very few of *Padro Ximenes*, and one or two other varieties. The vines in this vineyard appeared to be in the highest state of health, and had evidently been treated with the

greatest care from the commencement. They were now twenty-five years of age; the branches were so well arranged that they balanced each other upon the stock; and few props were therefore required, the height of the stock being from 16 to 20 inches. Where, from the weight of fruit, a prop was required, it consisted of a piece of cane, with a fork cut in the end of it, and in this fork the branch rested. A small spot in the vineyard had been newly planted; he said the ground had been trenched to the depth of a *vara*, or a *vara* and a quarter. These vines were only manured once in four or five years; the reason of this, he said, was that the ground was not so cold as the albarizas, and did not require it oftener.

As the grapes were collected, they were spread out on large mats in the sun's rays. This is very commonly the practice in ordinary seasons; but owing to the late heavy rains coming upon the grapes when the most of them are fully ripe, they are in general hastening on the vintage this season without attending to it. The *vinador* said they would be put in the press to-night, and pressed next morning.

Mr. Cormack says, that this vineyard produces only the common wine of the country, and from the way it was cultivated he was sure it must yield 6 or 7 butts an acre, but he understood that a large portion of the grapes were sent to the market. The *arenas*, in general, he says, yield from 4 to 6 butts a Spanish acre, which is worth, on being made, about 22 *pesos* of 15 reals each. Thus, 5 butts will amount to 82½ Spanish dollars, which is equal to about £17 10s. (\$83 12) per *aranzada*, or £18 10s. (\$87 87) per English acre. This vineyard, he informed me, was worth 300 dollars per *aranzada*, or about £66 (\$313 50) an English acre. The albariza vineyards yield, on an average, from 2½ to 3 butts per *aranzada*, which is worth, including the *agua pias*, this year, (October, 1831,) 38 *pesos* per butt; 2½ butts amount, therefore, to £16 13s. 9d. (\$79 32,) or about £17 10s. per English acre. Mr. Domecq's vineyard was some time ago valued at 40,000 Spanish dollars. The extent being 191 English acres, and the buildings at that time worth 3,000 or 4,000 dollars, the value of the whole will appear to be £7,756 5s., or about £40 12s. (\$193 84) per English acre, the average produce being about 800 butts. This, at 38 *pesos*, will amount to £4,275 (\$20,306) for the value of one year's produce of the whole, or £22 7s. (\$106) per acre. The expenses of cultivation are stated by Mr. Cormack to be from 50 to 60 dollars per *aranzada*, and this also agrees pretty nearly with Mr. Domecq's statement. It therefore appears that the profit upon an acre of the *arenas* will be about £7 10s. (\$35 62;) upon the ordinary albariza, £5 13s. 9d. (\$27;) on Mr. Domecq's £11 7s. (\$54.) I am inclined to think that this estimate is pretty correct, as it applies to the *arenas*, but is probably underrated in the albarizas generally, and overrated in Mr. Domecq's.

The whole extent of the Xeres' vineyards, which produce wine fit for the English market, does not exceed 7,000 acres, and about double that extent will also include those of Port Saint Mary's and San Lucar. A great portion of the wines exported to England under the name of sherry, are the growth of Malaga, and are brought round and transhipped at Cadiz. Most of the sherries

sold by retail in England, under 40s. a dozen, are either of this kind or of the commonest qualities of the San Lucar and Port Saint Mary's vineyards. The whole quantity of sherry annually exported from Xeres, does not exceed 25,000 butts. In no case do the exporters send a genuine natural wine; that is, a wine as it comes from the press, without a mixture of other qualities. It is rather a singular circumstance that the sale of the produce of the common vineyards is more ready and certain than of that fit for exportation. The latter is all purchased up by a few individuals, and held by them till it is taken off by the gradual demand. The stock is equal to many years' consumption, and some of the holders are said to possess stocks to the amount of a million dollars. No wine is allowed by law to be sold for consumption till it is twelve months old. The produce of the *arenas* is much greater than of the albarizas, but a greater quantity of it turns sour. The very dry wine called Amontillado, is generally said to be produced in a way which no man can account for, as it is not possible to say beforehand whether the wine, when fermenting, will turn out sherry or Amontillado. If so, it is probably the result of a more perfect fermentation; indeed, Mr. Domecq agreed with me in this opinion. Rafael Torda, a Spanish writer on wines, says that it is the produce of a particular grape, the *palomina*. Although the Manzanilla and common wine of the country are more apt to turn sour than the sherry, the latter is also occasionally subject to that degeneration. Mr. Domecq said, that as many as 100 butts of the *Machar Nudo* had turned sour in one season; whether after the adoption of the plan of allowing the scum to escape during the fermentation, instead of returning it by the funnel upon the wine, I did not inquire. Perhaps it may be owing to the grapes of part of the vineyard being of an inferior quality, or there may be something in the soil or exposure which prevents their attaining perfection. Mr. Domecq said, that there are very few of the grapes which are good, even in the albariza vineyards, and that the finest sherries are produced from two or three varieties which are rather scarce; of one variety he found great difficulty in procuring cuttings, there not being more than two acres of it in the district of Xeres. Scuddiness is, however, the most prevailing defect in the sherry wines, and it is worth consideration whether this is not owing to imperfect fermentation. We tasted wine in Mr. Domecq's cellar which was quite sweet, although three weeks old. The violence of the first fermentation is suppressed by the smallness of the vessel in which it takes place; and until the original principles of the *must*, which remain undecomposed, are separated by subsequent repeated rackings, or changed, after a great length of time, into alcohol, they are always liable to rise through the wine, and produce this scuddiness. It is probable, also, that the absorption of the tartaric acid which the grape may contain, by the use of gypsum, may be a still further hinderance to the fermentation. On the whole, I think there can be no doubt that were the fermentation completed in large vessels, and the wine subsequently racked off into casks, this scuddiness would never appear; and, considering the general richness of the grapes of this country in saccharine matter, there would be as little danger of acidity if the casks

were thoroughly closed to the air when the fermentation should have ceased.

Thursday, 6th October.—This morning I again started in a calesa, and, after about four hours' travelling, accomplished the journey to the little town of *Bonanza*, above San Lucar, the distance being 4 leagues. The road was not made in any place, but there were bridges at spots which would be otherwise impassable. After about three or four miles' travelling, I quitted the vineyards, which for that distance crowned the chalky hills on both sides of the valley through which the road passed. The country was now open, and without a single tree or enclosure. I passed several farm steadings, if indeed they are worthy of the name. The buildings were of the most wretched description, and in the worst possible repair, contrasting, in this respect, most strongly with the cellars and pressing-houses in the vineyards, all of which were in good order, and well whitewashed. Here, however, no farmer lives upon his farm. At seed time he comes with a sufficient number of people to plough up and sow the land, and returns to the town till the season of harvest again calls him forth. The harvest is collected to a convenient spot, where the grain is trodden out by horses and cattle, and the straw is most generally burned; and this closes the labors of the year. At one place I saw seven men ploughing, each with a pair of oxen, and following each other in the same furrow. The oxen were yoked by the head, the yoke resting immediately behind the horns, and being secured round the forehead of the animals. Near *Bonanza* I passed several steep hills of *albariza*, covered with vines, and terraced on the most precipitous side.

The banks of the *Gaudalquivir*, for ten miles above *Bonanza*, are low alluvial flats, apparently of great extent; and they appeared, perhaps in consequence of the late heavy rains, too wet to bear the pasturage of cattle. From that distance the lands on both sides bore the marks of cultivation, and were covered with cattle and horses. The hills which bounded these alluvial flats were covered with olives. In several places they were gathering Indian corn and millet. On approaching *Seville* there was here and there a plantation of oranges. The alluvial banks had very much contracted in extent, and, though higher than those lower down the river, were in no place more than four feet above the water; but the river was very muddy, and was probably swelled in consequence of the rains.

Friday, 7th Oct., Seville.—I find that the *ordinario*, or carrier, with whom I was recommended to travel to *Malaga*, is not now here, and is not expected for several days. I am told on all hands, that it would be madness to attempt travelling in any other way, as the roads are so much infested with robbers, that every person who attempts to travel, unless under the protection of the *ordinario*, is sure to be stripped. The latter personage purchases immunity for himself and his passengers, by paying a sort of *blackmail* every journey. During the week which I remained at *Seville*, waiting for the carrier, I made two short excursions to the country. I had understood at *Xeres*, that the neighborhood of *Seville* was famous for its plantations of olives, and I was anxious, during my stay here, to learn as much as possible on that subject. My first expedition

was to the ruins of an ancient Roman city, named *Italica*, which stood on the opposite side of the river, about two leagues above where *Seville* now stands, with the double object of visiting the ruins, and a convent of Hieronimite monks, who had extensive olive plantations, and presses for extracting the oil. I was accompanied by a gentleman belonging to an English mercantile house, to the head of which I had brought a letter of introduction. We passed one vineyard, the only one I saw within many miles of *Seville*; and the wine of this, the *calsera* said, was not good. We made our first visit to the convent, as it was now 11 o'clock, and the dinner hour of the monks was 12. A monk, whom we met in the outer yard, desired one of their farming men to show us the oil press—a very clumsy affair. The press consists of a beam of immense length, and not less than five cubic feet in thickness at the thickest part. The pivot or hinge, on which this lever works, is placed at about one fourth of the length of the beam from its thickest end. The long arm of the lever is pressed upwards by a screw, and the thick end is thus pressed down upon the olives which are placed under it, enclosed in a kind of mat made of grass, after having been broken in a mill. There were two of these levers in the house. The man who showed us the presses said, that a good olive tree would yield from three to four *fanegas* of olives in a good year, and that generally a *fanega* of olives would yield an arroba (about 4½ gallons) of oil.—From the oil presses we went to the garden, where there are a few fruit trees, and where they cultivate vegetables. There was neither variety in the plants, nor taste in their distribution; but here, as elsewhere, there was a *noria* at work, with one ox. The water was conveyed throughout the garden by small canals. The *procurador* or steward of the convent, to whom notice had been sent by the first monk of our wish to see the premises, had returned an answer that he was occupied and could not come. We now went up to the granary, and found him employed in taking an account of a quantity of wheat which some men were conveying from one part to another. Don *Perez*, my companion, expressed to him my wish to see every thing that was to be seen, and particularly the oil presses. "Ah," he replied, "the English are a very ingenious people; but they already know every thing sufficiently well, and do not need to be instructed." He therefore saw us walking about the granary without stirring from his seat, or offering a single observation, and he seemed very well pleased when we took our leave. The granary contained a considerable quantity of very fair wheat, also some Indian corn and millet. I looked in vain, to discover a single weevil, and found that this insect, which occasions such ravages with us, was only known here by name. As we proceeded to *Italica* we found a large number of people shelling maize—the greater part belonging to the monks, who are the proprietors and farmers of most of the land surrounding their convent. Their mode of shelling was to take a blunt iron instrument (most of them used the back of a reaping hood, or the instrument with which they clean their ploughs,) and holding the cob in their left hand, with the thick end up, continue striking it till all the corn is off. Each stroke stripped the cob from top to bottom of the place where it was struck. I put the question to

several, and they said that one person would thus shell from 4 to 5 fanegas, that is, about from eight to ten bushels in a day; and that they received a rial for each fanega; that is, from the 4th to the 5th of a dollar per day; but they do not earn such wages at every kind of work. The crop of maize appeared, from the quality of the grain, to have been a fine one, and one of the persons told me that it had yielded at the rate of about 50 bushels an acre. The olives on the trees we examined, in the neighborhood of the convent, did not appear to have suffered so much as those of Xeres. The man who showed us the presses, said that there was no such thing as a failure in the crop of olives every second year. He said they had all suffered very much this year in consequence of the rains in summer, but that even this year *their* olives had not failed. On returning we struck off into a field where a lot of men and horses were employed in treading out millet. There were nine horses, and a driver to every three. They were driven round the circle all abreast; the whole superficies of a very large circle, from the centre outwards, being covered with the tops of the millet which had been cut off with very little of the straw. They had begun about mid-day and would finish at night. The produce would be about 80 fanegas—160 bushels. Many of the fields in this neighborhood are cultivated with corn crops under the olive trees, and they say that the crop is not injured by the latter. The olives are never matured unless the ground under is cultivated, and then they of course receive a share of the advantage which is intended for the corn.

Having been told by the merchant to whom I brought a letter of introduction that a Spanish nobleman, the Marquis del Arco Hermoso, had introduced the Florence mode of preparing oil, which he had learned during a residence in Tuscany, I determined on visiting his plantation, which lay beyond the town of *Alcala*, about four leagues from Seville. On this excursion I was accompanied by Don Francisco Dias, a Spanish gentleman, who spoke French, and to whom I had brought an introduction from Mr. Gordon, of Xeres. We expected to find the Marquis, who was a particular friend of Don Francisco's, at his plantation.

The town of *Alcala*, perhaps from its excellent situation for water mills, is almost wholly inhabited by bakers, who send their bread to Seville. At almost every door we saw the women sitting picking from the wheat the small stones, and other impurities, which it collects from their rude mode of thrashing.

The marquis had left his country house about an hour before our arrival, but we found a very intelligent peasant, who had the management of it in his absence, and who answered my questions with great readiness and intelligence. There are 200 *aranzadas* under olives, which have this year suffered much from the rain. When rain falls in August, as was the case this year, the olives always suffer from it. He estimates the present crop at about 2,000 fanegas of olives, which will yield about 1,500 arrobas of oil; but in a very favorable year the plantation will yield 5,000 fanegas of olives, or about 3,750 arrobas of oil. All the ground we saw was a very light sandy loam. It is ploughed once a year. They plough an *aranzada* of the olive ground in a day, but not more

than half that quantity of the meadow or corn land below. There are five kinds of olives on the estate: one of them, the *La Reyna*, is of a very large size, and is pickled for eating. The tree of this variety produces but little fruit, and the fruit when pressed yields but little oil, but it is very highly prized for eating, being as large as a good sized plum.

The mill for grinding, or crushing the olives, consisted of a large circular stone, sloping inwards to the centre, where a sufficient space was left level for a millstone of seven feet in diameter, and 14 inches in thickness, to turn upon its edge. An upright beam, fixed to the centre of the millstone, and turning on a pivot, gave it motion. After having been brought home, the olives lie in a heap, on an average about fifteen days before they are crushed. After having been crushed, they are put into the press, and it is the common practice to pour hot water upon them, in order to extract the oil. They are pressed thrice, and each time with the addition of boiling water, there being a large boiler built into a furnace to supply the water. The fluid runs from the press to a cistern, and when it is filled, the oil flows over the top, leaving the water below, which is cleared away, as necessary. The peasant said, that all the difference between the fine and common oil was, that the former was the virgin juice, drawn off with cold water, and not mixed with the second and third pressings. The press in this cellar was of the same construction as those at the convent; it was 20 paces in length, 14 of which were on the long arm of the beam, and 6 at the short or press end. It must, from its thickness, contain many tons of timber. The oil is kept in large jars, some of which were built into a projecting part of the wall, and were sufficiently capacious to contain 100 gallons each. The fine oil produced by the Marquis is not relished by his countrymen; they say it has no taste, and prefer the rancid oil which they have been accustomed to use.

The trees on this property are reckoned very young for olives, although they are sixty years old. They are pruned every year. A man will prune half an *aranzada* in a day. But olive trees are said not to require pruning at all, till they are 25 or 30 years old. Two hundred *aranzadas* are equal to 191 English acres, and 3,000 arrobas of oil, the average annual produce, are equal to 12,735 English gallons, old measure, about 63½ gallons per English acre.

I do not know, however, whether there was not included in this estimate 40 *aranzadas* that are entirely planted with the *La Reyna*, which are never pressed for oil. Even with this deduction the produce would fall very far short of what the trees of the Hieronimites were said to produce; namely, from three to four fanegas of olives each tree, each fanega yielding an arroba of oil. An English acre will contain 60 trees, 27 feet apart, which is about the distance they were placed from each other on the Marquis's plantations; and, indeed, 60 was said by the peasant to be the number on each *aranzada*. One hundred and fifty-three acres, bearing 60 trees each, will contain 9,180 trees, and the produce being 3,000 arrobas, it is scarcely one third of an arroba for each tree.

This comes nearer to Don Jacobo Gordon's statement, that from 1½ to 1½ arroba is reckoned a good return from each tree. The trees of the

Hieronimites, as well, indeed, as the most of those I saw in the neighborhood of Xeres, were planted on a richer soil, and were of much larger dimensions; but this could never cause such a difference as to reconcile the different statements.

The principal exports from Seville are bitter and sweet oranges, and lemons. The sweet oranges are more cultivated than the bitter. I visited several plantations; one belonging to Mr. Wetherall, the merchant to whom I had brought an introduction. The plants are all raised from pips of the bitter orange, and when the stocks are four years old they bud them with two or three eyes of the sweet orange. The orange groves are reckoned of great value. The trees are planted at the distance of 21 or 22 feet each way, and, in good years, will yield from 1,000 to 1,200, or even 1,500 oranges each. They are irrigated every ten days, and the soil is disposed in small trenches to allow the water to spread. This plantation was watered by means of a steam engine, which was erected in a neighboring tan yard. Seville also exports wool and oil; but very little wool has been exported this season, in consequence of an expectation that Saxony wools would be excluded from the ports of England on account of the *cholera morbus*. Prices have risen so largely, on this account, that the merchants cannot execute the orders of their correspondents. The wools shipped from Seville are those of Estremadura, and are of inferior quality. The chief shipments of the Segovian and Leonesian fleeces are made from Bilboa. I believe no person in New South Wales was aware, at the time the prices of their wools sunk more than 50 per cent. in the English market, (4 or 5 years ago,) that the Spanish government had repealed an export duty of two rials (10 cents) on the wools of Estremadura, and three rials (15 cents) on those of Segovia and Leonesia; and thus enabled wools to be exported to a vast extent, which would never otherwise have reached the English market. About 50 vessels, of from 80 to 120 tons burthen, are annually loaded with oranges and lemons at Seville. The chief plantations are at some distance from the town. It appears to be a fruit not much used by the inhabitants themselves. There was scarcely an orange tree to be seen in private gardens, or in any of the small villages round Seville. At the present season they are gathering the *Grenadilla*, or pomegranate, which is very abundant; and this, with melons, and bread, and olives, seems to constitute, at this season, the principal fare of the common people at all times of the day.

Wednesday, 19th October.—On Thursday morning last I joined the caravan of the *ordinario*, which, on its starting, consisted of six wagons, besides a covered cart with stuffed seats and backs, called a *tertana*, in which were three friars and myself. A number of persons, on asses and on foot, also accompanied us, but these gradually dropped off as we proceeded. It took six days, including a day spent at the town of Antequera, to accomplish the journey to Malaga, a distance of 130 miles. About eight miles before reaching the former town, a party of horsemen came in sight, to the evident consternation of every one. It was said they belonged to the party of Jose Maria, a famous brigand, who has 35 men well mounted and equipped, and levies contributions on all the roads throughout the province. They did not,

however, approach nearer than half a mile; and one of the muleteers having gone off to them, returned in three quarters of an hour, and said they were not robbers, but soldiers. Two miles farther on, however, we stopped at a house where we were told it was customary to make a contribution to guaranty travellers against robbers; and 14 dollars having been collected, we saw no more of the party which caused such alarm.

With little exception, the whole tract of country from Seville to Antequera is of the richest possible description, but in the most wretched state of cultivation. There are no enclosures save here and there a vineyard; and such is the state of personal insecurity, that no farmer or proprietor ventures to live on his land. The inhabitants are congregated in the towns or in miserable villages, and only visit the distant fields to give them the least possible culture, and to gather in the harvest when ripe. This being a cross-road, the inns were of the meanest description; and the fare, which was undoubtedly superior to the daily fare even of those above the rank of a peasant, was such as to indicate the greatest poverty. I did not see 100 head of cattle or twice as many sheep, during the whole journey; and only once was butcher's meat set upon the table. My companions seemed to consider themselves fortunate when the bill of fare included a stewed rabbit or hare; and this was in a country rich enough to support ten times its population, in the greatest abundance. From Antequera to Malaga, about 22 miles, the character of the country was totally different. Instead of the rich and extensive plains, bounded by gently rising hills covered with the olive, the road here wound through a continuation of steep rocks and hills, in many places approaching in character to mountains. But here the hand of industry had been at work, and, instead of a track formed by the successive marks of wheels, there was a road cut out of the sides of the hills, and winding through them with considerable art. Here and there, also, where a favourable spot was presented, a peasant had established himself; and the plantations of vines and olives, with which his industry had surrounded his habitation, had given to the narrow valleys, and steep declivities of the mountains, an appearance of cultivation and fertility that might be looked for in vain in the wide-spreading and rich valleys through which we had previously passed. As we approached Malaga these plantations became frequent, although the country only presents a succession of steep hills; the soil a loose brown loam, plentifully mixed with the gravel of the strata beneath, which is a blue or gray shale or schistus, turning brown and falling to pieces on exposure to the atmosphere. In many places, as appeared at the sides of the road, there were five or six feet in depth of this loose soil, before it came upon the more solid material. It was evident the vines had been planted without the ground having undergone any previous preparation; and no provision was made, even in the steepest places, to prevent the soil from being washed away. The vines, in general, seemed to be treated in a very slovenly manner; the stock was close to the ground; and numerous weak shoots were springing out in every direction.

It was seven in the evening when we entered Malaga, having been travelling from three o'clock in the morning, at which time we started by torch

light. During the whole of this time the mules had no food, and only one hour's rest, which was afforded them by the overturning of a wagon, and yet they came into Malaga without any symptoms of fatigue.

After enjoying a comfortable night's rest, I proceeded to deliver my letters of introduction. One of these was to Mr. Kirkpatrick, the Hanoverian consul, a Scotchman by birth, who had resided 40 years in Spain, and whose kindness to travellers is proverbial. I found that the season for preserving raisins had been over for some time; Mr. Kirkpatrick, however, lost no time in ascertaining what information could yet be procured.

Friday, 21st October.—At day-break this morning, a gentleman, whom Mr. Kirkpatrick requested to show me his vineyard and explain the process of preserving the grapes waited upon me, and we set out immediately. Our road, lay along the shore, to the eastward, the vineyard of Don Salvador Solier lying in that direction, at the distance of about 14 miles. In the immediate vicinity of Malaga the country is extremely rugged, but every patch where it was possible to thrust in a plant was under cultivation. The rocks consisted of rugged masses of limestone, alternating with the same kind of slaty schist I had previously observed on the road from Antequera. For the first two leagues there were few vineyards, chiefly owing to the ruggedness of the country, which would not admit of cultivation. Beyond that distance almost every hill was covered with vines, the produce of which is all converted into raisins. The grapes are all of the large white Muscatel—the *Muscatel Gordon of Rozas Clemente*. This grape, my companion informed me, does not succeed in the interior, and therefore all the Muscatel raisins are made within two leagues of the coast. The *Lexia* raisins, which are used for puddings, &c., are made in the interior. We arrived at the country house of Don Salvador at nine o'clock, and, after a substantial breakfast, sallied out to examine the vines. Six or seven workmen were employed in preparing the ground for planting, within a short distance of the house. They did not trench the whole of the ground, but dug out square holes about two feet in diameter, and not more than 20 inches in depth. The distance of the centres of these holes from each other is seven feet, and this is the distance at which the vines on the hills round Malaga seem invariably to be planted. The vineyard I was examining, as well as all those in its vicinity, consisted of a series of steep hills. The soil every where was a decomposed slate, mixed with abundance of gravel of the same substance. On the higher part of the ground this soil appeared rather hard, and required great labor to break it up, but once broken up it is loose for ever; so much so, that it slides away from under the feet even where there is only a slight slope. There is no difference made in the distance at which the vines are planted, between the hills and the valleys: although in many places, on the former, the shoots scarcely extended more than 10 or 12 inches, while in the valleys they extend to the length of as many feet. They never, under any circumstances, manure these vineyards; they say it would give more wood, but would not add to the quantity of the fruit. The branches are pruned closer to the stock than those of any vines I ever saw; nothing but the half-formed buds, at

the junction of the old and new wood, being left to produce the wood of the succeeding year. I could not find an instance where the spur had been left long enough to include the first full-formed bud, which is generally from half an inch to an inch from the junction. The number of shoots seemed almost unlimited; I counted from 10 to 22; there was scarcely any vine had fewer than 10, and they generally had from 12 to 15. The stock was close to the ground, and not the slightest effort made to raise the shoots, or support them from the ground. Almost every bunch would therefore lie on the ground; and, were the soil of a less gravelly description, the greater part would without doubt be lost. After the pruning, they dig over the ground and lay bare the stocks, in order to scrape off the *barbe*, or small thread-like roots which are near the surface. As scarcely any grass or herb vegetates among these vines, and the soil is always sufficiently loose, it is evident that they require little digging or cleaning. We went out to visit a peasant, a neighbor of Don Salvador's. He said four or five very fine vines might yield raisins enough to fill a box which contains an *arroba* of 25 lbs.; but throughout the country it would require, on an average, nine or ten. The grapes lose about two thirds of their weight in drying: this would, therefore, give a produce of 7 or 8 lbs. of grapes to each vine—a calculation which I should think must include a much greater proportion of stunted vines than of luxuriant ones; for the majority of those in Don Salvador's vineyard would, I have no doubt, yield double that quantity. Including, however, those vines which are visible at the tops even of the highest hills, the calculation is likely enough to be correct. The peasant whom we visited was making wine from some of his grapes, which, after having been nearly dried, were spoiled by the rain. In a small skilling, behind the cottage, a portion of the floor, about ten feet square, was elevated above the rest. It was paved with tiles, and a man was busy trampling the raisins, which he had almost reduced to a paste. He heaped them into a corner as he successively passed them under his feet for the press, which was merely a large beam passing along the skilling, without any screw, or any other means of giving it additional power as a lever. A little water was added to the grapes to bring out the juice, and a part of the *must* was on the fire boiling, to add to its strength. We tasted some wine made two months before from the *Pedro Ximenes* grape, and also some from that grape mixed with the Muscatel; both were as sweet and luscious as possible. The grapes, when dried, are worth double what they would yield made into wine, and therefore they are never made into wine unless spoiled by the rain.

They usually commence gathering the grapes about the middle of August, choosing only such bunches as are ripe. They return, after a week or two, to make another selection, and so on for a third and fourth time. A place is always reserved in the vineyard, free from plants, on which to spread the grapes when gathered; and they choose a spot where the soil is of the darkest color, in order to its keeping the full force of the sun's rays during the day, and retaining the heat during the night. The bunches are spread out separately on the ground, and never allowed to press upon each other:—according to Don Salvador they are

only once turned over. At the end of 15 days they are, in general, sufficiently dry. This season was more unfortunate for the early commencement of the rains than any season for many years, and the crop was remarkably fine. It is Don Salvador's intention, in future years, to have wooden *toldos*, or awnings, prepared to shelter the grapes, while drying, against the rains, and also to cover them during the night. He says that the drying of the grapes is so much retarded by their being exposed to the dews during the night, that when he has the means of covering them at night, he expects they will be dried in half the time usual at present. Before the bunches are spread out, the small grapes are picked out, as well as any which may happen to be injured: the small grapes are dried separately. I saw a heap of them in Don Salvador's house, which had the appearance of very large currants. When the grapes are turned, any spoiled ones are, or ought to be, picked out; they have no particular rule for judging when they are sufficiently dry,—it is learned by experience. When they happen to get rained while drying, the stalks become black or rusty-looking, instead of being of a bright light brown. According to Don Salvador, the district which produces the Muscatel grape extends only two leagues farther east; that is, not more than three leagues in all, along the coast, and two leagues inwards. He says the value of the land planted with it is about 3,000 rials, or 150 Spanish dollars per *fanega*. There is a piece of land, adjoining their own, which they are anxious to buy; they would give for it 1,500 rials per *fanega*—to plant it with vines would cost 500 rials more, and there would be no return for three years. Each *fanega*, he says, contains 650 stocks, and as each stock is seven feet apart from its neighbors, the number of square feet in a *fanega* will be 31,850, which is 2 roods 37 perches English measure. It required, he said, ten men for a day to hole a *fanega* for the plantation. If, therefore, 10 stocks give 25 lbs. of raisins, a *fanega* will give 1,625 lbs., or 65 *arrobas* or boxes of 25 lbs. each; which would be, for an English acre, 2,222 lbs. Don Salvador pays his workmen 3½ rials, about 17½ cts. a day, besides food. The food consists of, in the morning, a soup of lentils, &c.; at dinner, pork; and at supper, the *aspachio*, or cold soup, formerly described, bread and grapes at discretion. The whole costs about 5½ rials, or 26 cents a day.

Saturday, 22nd October.—Having read over to Mr. Kirkpatrick my notes of yesterday's excursion, he said that Don Salvador's information was generally correct, but added the following observations:—The Muscatel grape, Mr. Kirkpatrick thinks, must be cultivated as much as four leagues from the coast, but will not succeed beyond that distance. The extent of coast which admits of its cultivation must also be five or six leagues, at least, as the principal cultivation is in the neighborhood of Velez Malaga, five leagues to the eastward of Malaga.—There are three distinct sorts of raisins:—1st, the Muscatel, which are the finest, and are always packed in boxes of 25 lbs., and half and quarter boxes, containing, respectively, the half and quarter of that quantity.—2dly, Sun or Bloom raisins: these are prepared in a manner in every respect similar to the Muscatel, but from a different grape; a very long grape called in the country *Uva Larga*. These are also generally packed

in boxes, but sometimes in casks. Those in boxes are also called *bunch raisins*; the others are generally of an inferior quality, and separate from the stalks. The sun or bloom raisins keep better than the Muscatel, and for that reason, it is this description which is usually sent to India. 3dly, the Lexia raisins, which are packed in casks, or grass mats called *frails*. These raisins are of an inferior kind, and require to be dipped in a lie (*Lexia*) of wood ashes, with a little oil, before drying.

Muscatel raisins are worth to the grower from 30 to 40 rials a box, according to the season. This year as much as 52 rials was given for some that, with the aid of *toldos*, had been preserved without having been touched by the rain. When Muscatels are 40 rials, or 2 dollars a box of 25 lbs., Blooms are about 30 rials, and Lexia only from 24 to 28 rials per quintal of 100 lbs. Mr. Kirkpatrick says, that 12 English acres make 13 *fanegas*. According to this calculation, an acre will produce, at 2½ lbs. to each stock, 1,760 lbs.; which, at 40 rials the box, or 4d. (8 cents) a pound, are worth £29 7s., (\$140,) at 30 rials £22, (\$104 50) an acre. From this must, however, be deducted the expense of 70 boxes, at 4 rials each, which amounts to £2 17s. 6d. Still, it seems a most profitable cultivation; so much so, that I incline to think the quantity is less than that estimated. The expenses of cultivation cannot exceed £5 or £6 (\$24 to \$29) an acre. The following accounts of the exportation of fruits from Malaga were taken from detailed statements which had been copied from the custom house cockets, and were kept in the office of Mr. Kirkpatrick.*

The boxes are partly *Bloom* or *Sun raisins*, but principally *Muscatel*. The barrels and frails are chiefly *Lexias*.

In the spring, shipments are made for the Baltic, and small parcels are sent, at all times, in assorted cargoes. On the whole, Mr. Kirkpatrick is of opinion, that from 20 to 25 per cent. may be added to the shipments of the fruit season, to make up the whole export from Malaga. This would make the whole weight of raisins annually exported from Malaga from 4,000 to 4,500 tons. The almonds shipped from Malaga are of the kind called *Jordan*; and these, as well as the Muscatel raisin, will only grow in a very limited district. Mr. Kirkpatrick has this day about 100 women shelling almonds in his yard. This costs three rials a *fanega*, which yields from 20 to 22 lbs. of shelled almonds. A *fanega* is the produce of about four trees. The grower gets from three to four dollars for a *fanega*. The women break each almond separately, laying it on a small anvil, and striking it with a small iron rod; others pick them out from the shells on a table. The confectioners purchase the shells for their fires, and they almost pay the expense of shelling. Such is the superior value of the *Jordan* almond, that the duty upon them in England is £4 15s. per cwt., which is double that upon the common sorts. The *Jordan* almond is distinguished in appearance from the common, or Valencia almond, by its greater length.

Monday, 24th October.—I this day visited the stores of Messrs. Rein and Company, the first mercantile house in Malaga. They were receiving, in one store, *Lexia* raisins from the country.

* See next page.

ACCOUNT OF FRUITS EXPORTED FROM MALAGA.

COUNTRIES TO WHICH EXPORTED.	No. of Vessels.	RAISINS.		ALMONDS.		FIGS.	GRAPES.	LEMONS.	ORANGES.	POMEGRANATES.
		Boxes of 25 lbs. each.	Barrels of 100 lbs. each.	Fractions of 56 lbs. each.	Boxes of 28 lbs. each.	Barrels of 100 to 300 lbs. each.	Fractions of 100 lbs. each in shell.	Cases, barrels, and fractions, 56 lbs. each.	Cases of 1000 Oranges.	
Year 1828, from 1st Sept. to 31st Oct.	England	83,410	11,624	4503	6775	1017	8	2162	4984	321
	France	21,156	1479			3		2027	787	41
	Holland	901	3906					20	1649	78
	Bremen	300	1326					40	170	50
	Hamburg	2051	4825	380		15		565	2080	25
Year 1829, from 3d Sept. to 30th Oct.	Copenhagen	400	3180					430	660	88
	Petersburgh	950						1400	420	
	United States	39,424	7604		91		595	1680	418	
	Totals	148,592	33,944	4883	6866	1035	603	6904	11,163	165
	England	52,909	6004	612	2546	535	10	1955	3942	202
Year 1830, from 24th Aug. to 27th Oct.	France	31,859	1970			60		1105	1275	24
	Holland	17,627	4810	50				362	1845	54
	Bremen	280	720					33	110	
	Hamburg	6315	3571				50	1230	3083	65
	Copenhagen	827	4795			5		831	1114	10
Year 1831, from 1st Sept. to 30th Oct.	Petersburgh	500						1400	450	
	United States	89,840	11,379		404	62	1501	3494	2169	550
	Totals	200,160	33,249	662	2950	662	1561	8977	13,988	580
	England	45,582	3219	2319	2987	885	4	962	3938	203
	France	17,487	1486					200	115	60
Year 1832, from 24th Aug. to 27th Oct.	Holland	9170	1773					1018	1649	154
	United States	127,683	17,778		405	16	608	355	2982	
	Bremen	510	317					78	189	
	Hamburg	9227	994			4		263	3277	79
	Copenhagen	650	2902			13		625	785	
Year 1833, from 1st Sept. to 30th Oct.	Stettin	107	600					240	240	
	Petersburgh	500						49	840	10
	Leghorn	4000								
	Genoa	2000								
	Totals	216,916	29,069	2319	3392	918	612	3443	14,015	506

The grower, in the beginning of the season, got ten rials the arroba, of 25 lbs.; the price is now only seven. The quality this season is very bad; many of the raisins appeared bruised and burst by the rain. Ten rials the arroba amounts to two dollars per quintal of 100 pounds—one penny per pound. A peasant, who had come with the fruit, said they would get from ten to twelve quintals from a fanega. The persons in the office seemed to think, that, either from ignorance or intention, he understated the quantity. This would only be twenty-two dollars for a fanega.

Mr. Delius, the clerk of the fruit department, said, he thought the estimate of 1,625 pounds of Muscatels from a fanega, was likely to be correct. They usually, he said, expected 60 arrobas—that is, 1,500 pounds, in a good season; from 50 to 60 arrobas was the average. In the neighborhood of Messrs. Rein's stores they were packing lemons. The grower gets seven dollars for a case containing 1,000:—the largest are sent to England. They are each put into a piece of paper by women, who get through the work very rapidly; they are employed by the day, and get five rials, about one shilling, for their work. The green grapes sent to England are packed in oak saw-dust, which is imported from England for that purpose; no other kind will answer. It is a coarse fleshy grape called *Loja*, from the place where it is cultivated; it keeps till April and May. There is a large black grape very abundant in the markets at present, and also a large green grape, neither of which is distinguished for flavor; they are sold at four *quartins*, about one penny, a pound.

The house of Rein and Company have extensive sugar plantations at Almunecar, about 80 or 40 miles east of Malaga. I had determined to accompany Mr. Delius, a member of the house, to visit these plantations, in which I felt a great degree of interest, as I was confident, that if sugar could be cultivated here, it ought to succeed at Port Macquarie. An opportunity of a vessel for Marseilles having, however, presented itself in the mean time, I resolved on taking my passage by her. I procured from Mr. Delius the following information respecting the sugar plantations. Sugar has been cultivated in this part of Spain for nearly 100 years, but never to any very great extent. The plantations at present are more extensive than they have ever been before. The whole produce does not, however, exceed 20,000 quintals, of which 5,000 are produced by their house; 20,000 quintals, of 100 pounds each, are 894 tons. Rein and Company's own plantations are not very extensive, but they have erected a mill and distillery. They receive from the planters the cane, and return them one half of the manufactured article. Four or five kinds of cane have been cultivated, but they are now confining their attention to the large *Otaheite* cane, finding it succeed better, and yield a better return. The soil is in general of a loose sandy quality, but very rich, and is also richly manured.

The planting takes place in May, and the canes are cut in February following. The same stools will last for six years. They are cut down to 10 inches from the surface. Six plants are put into one hole, and the holes are not more than three feet apart, so that it is impossible to enter the plantation after the canes have got to a certain height. The ground is cultivated by ploughs

with oxen, but of course only when the canes are very young, or in the early part of the season. The cane grows to the thickness of a man's arm and from 18 to 20 feet high. Mr. Delius has seen fifteen feet of ripe cane. A fanega of rich land will yield from 45 to 50 quintals, that is, from 4,500 to 5,000 pounds of sugar. They have a refinery on the spot. This year their sugar brought 10 per cent. higher than imported sugar; and their rum promises, when old, to be equal to that of the West Indies. It is now two years old; but as they consider that the rum hitherto made has failed to come into use, from having been sold to the consumer too early, they intend to hold it for two years longer. The frost sometimes injures the sugar cane a little, but frost seldom occurs. Twice during 20 years Mr. Delius has observed it of the thickness of a dollar in the night. The ordinary range of the thermometer, during the day, in the winter months, is 56 to 58; in May and June, 72 to 75; in July and August, 78 to 82 or 83, except when one or twice during the season, it blows over the land, when it rises to 100. The temperature of the atmosphere along the coast is exceedingly equable. During 20 years Mr. Delius never observed the barometer vary more than an inch; its range is between 29½ and 30½. The sugar cane will not grow except within five miles of the coast. Beyond that distance the frost is greater, and the weather more unsettled. The land planted with sugar cane is irrigated twice or thrice when the shoots are very young, but Mr. Delius thinks not afterwards. All the plantations command the means of irrigation.

With reference to the value of vineyards, a friend of Mr. Kirkpatrick's gave me the following information: He purchased an estate five years ago. It is situated about two leagues from Malaga, and is all mountain. Vineyards are valued by the number of stocks. An *abrado* contains 1,000 stocks; this, at seven feet distance, gives 180 perches, or one acre and 20 perches, as the extent of an *abrado*. In this estate there were 80 *abrados*, or 90 acres, planted with vines, which were in very bad order. Also about 150 acres more, which were not planted, and were considered of very little value. The price was 5,000 dollars, about £1,050, nearly £12 an acre for the vines, counting the remainder as nothing. The produce was very little the first four years; last year 600 arrobas, this year 1,000 and if the next season be favorable, it will produce 1,500 arrobas. The new wine, as soon as the fermentation is over, is worth from nine to ten rials an arroba; 1,500 arrobas are equal to about 4,500 gallons which is only 50 gallons an acre, and at the highest price only eight dollars and one third per acre. This is so poor a return, both in quantity and value, that it is probable the vineyard is still far from having been brought into full bearing, and that the 150 acres must have been considered worth a considerable part of the price, notwithstanding its depreciation.

The produce of the vineyards round Malaga, which is not converted into raisins, is now chiefly a dry wine. It is similar to sherry, but very inferior in flavor, and is chiefly taken off by the Americans. The demand from America has greatly increased since the general establishment of temperance societies in that country. This wine retains a sweet taste till it is two years old. The

Old mountain, or Malaga sweet wine, which was formerly so much in demand, is now almost out of fashion throughout the world, and is very little made. It was formerly the chief export from Malaga.

Friday, 28th October.—Having been introduced to Mr. Bryan, a gentleman of Irish extraction, and brother-in-law to Mr. Heredia, one of the principal merchants in Malaga, I went with him to visit the cellars of the latter. There is no such wine as *Malvasia*, which is said, in the *Topographie des Vignobles*, to be produced at Malaga. The Muscat wine is very scarce, the raisins being so much more profitable. They make a white sweet wine with the Pedro Ximenes, and a small portion of the Muscat wine added to it, to give it the flavor of Muscat wine. The sole difference between this wine and the Mountain, is that the latter is mixed with a portion of *must*, which has been boiled down to one third; this also gives it the brown color. Mr. Bryan says, that within the last two years there has been a great demand for sweet wines from the United States. Most of the wines this year were, therefore made sweet, and the farmers are getting a better price. The new wine is this year worth to the grower twelve rials the arroba. The difference in the making between the sweet wine and the dry is, that when the grapes are intended for the former they are spread out for three or four days in the sun. The new wine, when sweet is worth a third more than when dry. An abrado of 1,000 stocks, even in the mountains, Mr. Bryan said, will sometimes yield three or four butts of wine. Mr. Heredia has lately purchased a vineyard of 400 abrados, which they are now improving. In one or two years more they expect it will yield 1,000 butts of wine annually. Mr. Bryan thinks it may contain 500,000 stocks; he says the varieties of vines chiefly cultivated, are the Pedro Ximenes and the Doradillo. Both the dry and the sweet wines are made from them, the difference being only in the management. In Mr. Heredia's vineyard, which is situated to the north of Malaga, near the top of the mountain, there are fifteen varieties of wine; but by far the greater portion consists of two varieties already mentioned. The system of pruning in the neighborhood of Malaga has hitherto, Mr. Bryan says, been very bad, it having been the universal practice to leave a spur on every shoot, weak or strong, and no care was taken to keep them from the ground. Since their houses became such extensive proprietors of vines they have procured men from *Xeres de la Frontera* to prune the vines, according to the system pursued at the latter place; but they find great difficulty in getting their own people to follow the example set. Mr. Bryan pressed me very much to visit with him their vineyard, which they were now pruning, the leaves having fallen, in consequence of the difference of temperature at that elevation, although near Malaga they were still perfectly fresh; he promised to send to Mr. Kirkpatrick an assortment of cuttings of every variety in the vineyard; and on the other hand he requested me to purchase all the publications which have lately appeared in France, on subjects connected with vine growing, and forward any information which might strike me as particularly valuable to them. This, he says, may save him the trouble of a trip of France, which he was contemplating.

Mr. Bryan disapproves of the system pursued in Xeres, of leaving a void of one fifteenth part in each cask, with the bung loose to admit the air. He refers to Dr. Ure's Chemistry as an authority against this practice. It seldom happens, however, that sherry wines thus exposed turn sour in consequence, although this would inevitably happen with wines of less body.

The farmers in the neighborhood of Malaga do not, like those of Xeres, hold their wine twelve months before selling it to the merchant. They have earthen vats, of the shape of an urn, and sometimes large enough to contain two or three butts. Into these vats the *must* flows as it is pressed; and as they become full, in order to make room for more, the wine is conveyed from them, more or less fermented, as it may happen, to the stores of the merchant. Their means of conveyance are mules and asses, the wine being carried in sheep skins; these skins, from being constantly used, do not, however, give any taste to the wine. No difference seems to be made in price in consequence of any real or supposed difference in quality; and the culture of the vine, excepting that of the Muscatel for raisins, seems to be a very poor pursuit.

Messrs. Heredia and Co. sent a quantity of wine to America without brandy, and it was much liked, and considered to bear a resemblance to Champagne. I also tasted wine of a year old, which he said resembled what had been sent. It was very deficient in flavor, but promised to be a wine of a good body when older. I also tasted some wine which had been sent to Havana for the voyage, but it seemed to me to be exceedingly vapid and flavorless. Mr. Bryan complained of the presence of tartaric acid in their wines, which gives it, when new, a harsh taste. It appeared to me that this acid was rather deficient than in excess, and I told him I thought their wines would have more character if fermented with the husks, and, perhaps, even a part of the stalks. I think their vapid taste, or *fadeur*, to use a French expression, is chiefly owing to the *must* containing only the purest principles of the grape. A more violent fermentation, produced by a larger quantity being fermented in a mass, would, on the other hand, make the wine ripen as early as at present, notwithstanding the addition of these other principles. Indeed, there can be little doubt, that by allowing a large portion of tartaric acid to mingle in the *must* with the husks and stalks, a perfect fermentation would be much earlier effected.

The best wine in Mr. Heredia's cellars falls far short of a good sherry. They have not yet adopted the system of having soleras, which are never exhausted. But Mr. Bryan says, their attention has been so largely devoted to other pursuits, that hitherto they have not paid so much attention to their wines as they will do now that they have embarked so largely in the business.

In the evening I accepted an invitation from an old Irish merchant, who has been settled in Malaga for forty years, (Don Juan Langan,) to visit his cellars. He has been in the habit of sending choice wines to England and Ireland, and particularly of supplying the cellars of noblemen, and men of great wealth. Although his stock is not very large, he has decidedly the best wines I have tasted in Malaga; that is, dry wines. Some of them, he says are twenty years old and upwards.

Some of his wines of seven or eight years old resembled a good sherry, and he agreed with me in thinking that his sweet wine of that age was equal to those three times as old. He further agreed with me, that the great age of those wines did by no means add proportionably to their quality; and he evidently understands the art of giving the qualities generally attributed to age, by mixing, and other management. He himself hinted at the success with which he had conducted this branch of trade, and he has the reputation of having acquired great wealth.

In the evening I for the last time took leave of my kind and worthy friend, Mr. Kirkpatrick, and embarked on board the French schooner, in which I had engaged my passage to Marseilles. I left with Mr. Kirkpatrick the following memorandum: "A box three feet long, by two feet deep, and two feet wide, will contain nearly 500 cuttings of vines, each the full length of the box. The book called *Conservaciones Malagueñas* contains a list of the varieties cultivated in the neighborhood of Malaga. Perhaps there are some new varieties which were not known when it was published. About thirty varieties are there enumerated. This would allow of thirteen or fourteen cuttings of each kind to be sent; but it is not likely that it will be possible to procure cuttings of every kind; there will, therefore, be room in the box to send a greater quantity of the most valuable; for example the Muscatel (the Larga, or long grape, which yields the bloom raisins) and the Pedro Ximenes; six or eight cuttings of each would be enough of the less esteemed varieties. It will be observed that there are two kinds of the Muscatel; the smaller may be undervalued in this country, but it may suit our climate better than the other. Mr. Delius mentioned a vine which had produced bunches weighing fifty pounds. Perhaps it would be possible to obtain cuttings of this kind, perhaps of the identical vine. I should not like the little Corinth grape to be forgotten. A cutting should be taken from the lowest part of the shoot, as near to the stock as possible, the top part of the branch being cut away. Those are the best which contain the greatest number of knots or buds; a string to be tied round each variety, and a small piece of wood tied to the string numbered, so as to correspond with the number in the list and description.

"Besides the number in the book, and color of the grape, it would be desirable that the name most commonly given in the country should be stated; also, whether it is most esteemed for raisins or for wine; whether used for sweet or dry wines; whether a great bearer or otherwise; whether it ripens early or late; whether cultivated in the vineyards, or the gardens, and any other particulars which may distinguish it. The cuttings will pack better if procured as strait as possible. Should it be found that there is not room to send six or eight cuttings of the least esteemed varieties, let the number be diminished to four or five; but, under any circumstances, I should not like fewer than from twenty to thirty each of the Muscatel, Bloom, and Pedro Ximenes.

"The interstices formed by the cuttings to be filled up with sand and very dry soil. Two boxes of the above description to be prepared, one to be sent by the first vessel which sails after the vines can be cut with safety, which undoubtedly may be done about the 1st of December, the duplicate by

the next vessel that may follow, both addressed to Messrs. Walker, London, who will pay all expenses which may have been incurred up to the arrival of the boxes in London, and will send them to New South Wales by different ships, and by the earliest opportunities. Perhaps, in addition to the above, Mr. Kirkpatrick will take the trouble to procure a quantity, say a gallon, of the freshest royal dates of Barbary; also a few of the common varieties, and a gallon of Jordan almonds, and send them in a box to the same address. Also in the same box a few seeds of the very fine onion, which is so abundant in Malaga, and of any esteemed kind of melons, or any other fruit or vegetable grown from seed which may be considered worth attention. After my arrival in London I shall ascertain what are the best seasons and modes of sending plants of the Spanish chestnut and Jordan almond, and I will take the liberty to write Mr. Kirkpatrick upon the subject, satisfied, as I cannot but feel, that he will esteem it rather a pleasure than a trouble to contribute to the advancement of a colony containing so large a proportion of his countrymen as New South Wales."

During my stay in Malaga I also wrote to my friend Dr. Wilson a letter, which contained the following observations and queries relative to Sherry wines:—

"I have been thinking a good deal about the Sherry wines, and there are some points on which I have not been able to satisfy myself. You know we no sooner had the practice of returning the scum upon the wine, by means of a funnel, pointed out to us by Mr. Domecq, than we condemned it. It has occurred to me, that after all, it may in most cases be the best thing they could do. It is the saccharine principle that is undoubtedly most abundant in the grapes of these climates, and the imperfect fermentation which takes place in a butt, may require to be carried forward by the addition of the yeast, which, were it not for the funnel, would escape. I think Cormack used the expression, that it was to feed the wine that the scum was returned. In this I have no doubt he was correct. On the other hand, it seems to be agreed that a good deal of the Sherry even of the albarizas, turns sour. This might undoubtedly be prevented by a contrary arrangement to the above. I think Domecq said, that sometimes 100 butts of the Machar Nudo wine would turn sour in one season. I wish you would ask him whether there has been an instance of any of his wine turning sour since he adopted the practice of allowing the scum to escape. Perhaps there are particular kinds of grapes in the vineyard which yield a wine without body. Perhaps particular parts of the soil do not bring the grapes to perfection. You will see from Chaptal what a difference there frequently exists in France in the value of the produce of two sides of the same hill. It was a question I always forgot, or neglected to put, at Xeres, whether the difference of exposure was found to affect the quality of the wine. I suspect all these things have been overlooked.

"When I saw the state of the grapes which Domecq was pressing, and which seemed, in fact, no worse than others we saw in all directions, I thought it was easy to account for the scuddiness which so generally attacks Sherry wines. Casabon's overwear, however, afterwards showed us, that however broken or rotten in appearance, the

grapes were by no means in reality decayed. This shook my faith in scuddiness being the result of the employment of decayed grapes. On the whole I think if a more perfect fermentation were effected in the first instance, little scuddiness would ever afterwards be found in the wine. I think you will find in Chaptal, that the *graisse*, which I take to be the same thing, most frequently shows itself in wines which have undergone little fermentation; that is, where, in order to preserve the *bouquet*, the fermentation is stopped. He says elsewhere also, that it had been usual at Orleans to ferment the must with stalks and skins and all. At one time, however, they thought of relieving their wine of a degree of harshness, by not suffering the stalks to be fermented, but it was found that the wine was much more subject to *graisse*, and they returned to their old practice. He says, that in various parts of France they deprive the grapes, i. e. the must, more or less of the stalks, according as the season has been favorable or otherwise for maturing the grapes. In a very fine season they leave all the stalks, considering it necessary to produce a perfect fermentation. In no part of Spain, as far as I can find, do they ferment even the skins of the grapes.* Were I concerned in the business I should certainly attach much importance to, and expect important results from, a trial of the system of large vats, and the fermentation of the skins in order at once to effect a thorough fermentation. In most cases I think you would have an Amon-tillado; that is, if you allowed the grapes to be as ripe as they are allowed to be at present, dried them in the sun, and assisted their natural dryness still further by adding gypsum. (By-the-by, may the gypsum not contribute, by absorbing the existing acid, to produce scuddiness?) But if, as is the practice at San Lucar, you make the vintage before all the grapes should attain the perfect ripeness they do at present, and were less particular in depriving them of moisture, then I think you would have a wine something between the Manzanilla and the Amon-tillado; not so dry as the latter, but adding much of the mellowness and richness of Sherry to the lightness of the Manzanilla. The latter is, in fact, the natural wine of the country on the ordinary soils. If the produce of the albarizas were treated in the same manner, you would have a wine of the same character, but probably surpassing it in quality as much as the real wines of the Chateau Margaux and Haut Brion surpass the ordinary growths of Cleret. Add to this what I cannot but think would be a certain, and to the merchant the most important result, you would have a wine as ripe in eighteen months as it now is in three or four years. There are two or three other little points, about which I should like to inquire. Domecq said, a number of his grapes had rotted this year, in consequence of the wet weather and luxuriant vegetation. This he would prevent in similar seasons in future, by stripping off the leaves to give the grapes sun and air. Pray is this practice not generally known in the country? In the south of France it is a regular part of the labors of the vineyard, unless in remarkably dry seasons. Another query is, do they

*The red wines of Catalonia, and of other provinces which produce red wine, are of course an exception to this observation, as it is necessary to ferment the skins in order to give the wine a color.

never take the top off the branch after the grapes are formed?—I should like to know Pedro Domecq's ideas about the *agua pies*. In many seasons, Cormack says, the *agua pies* is better than the first pressing,—now this can only be owing to the over-ripeness of the grape—to its containing too much saccharine matter in proportion to its moisture. Would it not be better to make the vintage earlier? and, instead of adding foreign moisture, you would then have enough of the natural juice of the fruit, and enough also of saccharine matter, seeing its excess is the most general fault. But this would not suit the hot mouths of your English customers. If you have an opportunity, give me some particulars of the relative value of the albarizas and arenas. I am confident Cormack must be mistaken. I think it is barely possible but that the albarizas must be double, if not treble, the value of the others.†

Thursday, 10th November.—After encountering a succession of contrary winds and calms, we this day came to an anchor in the bay of Rosas, in Catalonia, the north wind blowing so strongly out of the Gulf of Lyons, that it was impossible to double Cape Creux. I was now on the verge of one of the most interesting wine countries in France, and was glad of this opportunity of quitting the vessel before her arrival at her destination. But on touching the beach we were informed that we must be put under quarantine, owing to a report that the yellow fever had broken out at Gibraltar.

Rosas, like most of the other towns I have seen on the east coast of Spain, is backed by steep hills, which are clothed with vines and olives to the very tops. In the distance are the Pyrenees, capped with snow. If one might judge from the state of these hills, contrasted with that of the rich plains of Andalusia, we might draw the conclusion, that wherever nature had been bountiful, man had been indolent; but where she had been niggardly in her gifts, the deficiency had been more than compensated by the industry of man. The hills above Rosas, as well as those in the south, exhibit every where an appearance of the most careful cultivation, and in general are covered with habitations, while it was rare that a detached house was met with for many miles on the plains.

(To be continued.)

INSECTS. INDIAN CORN. MILLET.

For the Farmers' Register.

I have noticed, in a late Register, that one who is known to be a good farmer, and intelligent, has determined to graze his lands for the purpose of destroying insects; will he permit me to inform him that this course will not answer his purpose. A few years past I grazed my lands very close, and cropped them severely; nevertheless, the insects increased so rapidly that with a microscope I could see on a small space thousands, of perhaps all shapes and colors. My corn has been more damaged by insects than other crops, but all have suffered; so that I have had at least an acre in a body, without a productive stalk standing. At my place of residence I now graze my fields very lightly; indeed some are not grazed at all, except in winter and early spring; yet my crops

are generally not sensibly affected by insects. I discover no damage this year amongst my crops, except my rye; and the failure of this I do not attribute to insects, but a peculiar state of the atmosphere.

I attribute my success to the almost incessant motion of the plough and harrow. Indeed, when I view my crops, and reflect that about twelve years past my grounds yielded to the acre only about 12 bushels of corn, 8 bushels of oats, and less of wheat or rye, and that crops are harvested from the better portions almost every year, I am astonished. I have now a lot of corn growing, containing 13 acres, which is at least equal to any I ever saw, and two others not far inferior. As to the estimated produce, I will not say; nor do I bet or banter. But this I say, if any Virginian may this year grow more corn to the acre than I do, I will give him \$10 for a bushel of seed.

The ground on which the first mentioned corn grows, had been cropped annually for about ten years, about half the time in corn, the balance in wheat or rye, but lightly manured; yet the crops, when not infested with insects, have been continually on the increase. It was ploughed to the depth of eight or nine inches three times, and harrowed as often before planting. The first ploughing was in July last, immediately after securing therefrom a crop of rye and oats, when it was also harrowed; the second ploughing was in December, when manure was spread, and not harrowed; the third was in March and beginning of April, and harrowed; and again harrowed the 18th or 20th April, and the corn planted. I will not say that all the insects are dead, but this I say, the corn is all alive, as a memorandum taken this day will show. July 15th, corn just beginning to tassel, from 8 to 10 feet high, large stalks, blades from 3 to 4½ feet long, and from 3 to 6 inches broad. The rows are 5 feet apart, stalks 10 inches apart, (or rather two stalks together 20 inches asunder.) This lot, as also my whole crop, was first tilled with the old Virginia coulter; second, the common cowtongue cultivator; third, the common Dutch shovel was run once on each side of the corn, and the cultivator in the centre; lastly, the cultivator, and my crop is clean.

My corn is a large and prolific kind, which being near the mountains induces me to plant late, otherwise my crops would be diminished by the increased shade of the taller growth. The uniformity of the growth in the field is not more pleasing than the uniformity of the produce; for it was originally from one ear; and I dare say if a late writer in the Register were to see my crop, he would not send to a Yankee for seed again. I have tried the genuine double-eared corn, which did not equal mine, and have again this year planted a small field with twins selected last fall from my own crop, but am very doubtful of improvement.

When I took up the pen, my principal object was to recommend to the public the culture of millet. Fessenden, in his 'Complete Farmer,' says "there are three kinds of millet," all of which are known to me, but that which is least known among us, and which is the true millet, grows about six inches taller than oats, with a larger stalk and blade, with the grain on the top, which is yellow, and about the size of the yellow mustard. This millet will grow on land of any quality,

makes as good if not better hay than oats, and the yield is about double as great. The northern writers say that millet must be mowed; but from experience I can with equal propriety say it *must not* be mowed. I cradle it, cure, bundle, and cut in a box, as if it were oats. By this method of harvesting, I cut about four times as much as could be mowed. Being cut higher, the hay is better, it is cured quicker, cured better, and finally it is ready for the cutting box, out of which it comes as soft and as nice as heart could wish. If sowed for hay, I put on rich land about one bushel to the acre, and on ordinary land about half this quantity. If sowed for improvement, the same quantity as above. If for grain or seed, from half a bushel to a peck to the acre, according to quality. But one consideration which enhances the value of millet higher than all others combined, is this: if a field of wheat, rye, oats, corn, tobacco, or grass, from any cause may fail, the millet is ready to stand in its stead. It will come to perfection if sowed at any time between February and August, or two crops may be made on the same ground in the year, or the small grain stubbles may be ploughed down in July, and the millet sowed. My millet intended for seed is now heading, and from 2½ to 4 feet high, and I am yet sowing, either to be made into hay, or ploughed down for improvement, as I may determine.

In closing, I would remark that I would be thankful to some of those who are abusing the old Virginia method of harvesting corn, to instruct me how I am to shock (stack) my corn, which, when grown, will be from 12 to 17 feet high. And lastly, Mr. Editor, the day is excessively warm, and I am very nervous, therefore please excuse this scrawl, and if worthy of insertion in the Register, please correct errors. And yet one more word: there are in Amherst many better tracts of land than mine, but on these the general yield is less.

Amherst, July 15, 1840. Z. A. DRUMMOND.

EXTRACT FROM PRIVATE CORRESPONDENCE, AND REMARKS THEREON.

* * * I have been truly surprised, not only that a single person, almost unaided, could sustain, with the success you have done, the interest of your paper, but how with any degree of capacity or diligence you could find the material, drawing so little as you do on former publications. * * * I regret that having been bred to a different trade, (and which you had the good sense to quit after a short trial,) I am not qualified to lend you assistance in your present better occupation. I think what I have gathered on a single subject from the Register, will bring me in (what I do not now care for a great deal) thousands of dollars, if I live a few years. * * *

It is gratifying and soothing to feelings irritated by general indications of unappreciated services, and of our efforts to promote agricultural improvement being unaided, slighted, and disregarded generally, to receive such a testimonial as the above, proceeding from such a source. But while we cherish the compliment to our publication, we must, in frank-

ness and in truth, admit that it is not deserved. Though our correspondent deems that the interest of the Farmers' Register has continued to be fully sustained, *we do not*. And, indeed, how can it do otherwise than fall off in interest and in usefulness, when, as our correspondent truly says, it is left for support almost entirely to our own lights on agriculture, (feeble and limited as they are,) and our own efforts to collect and diffuse information. In the first commencement and establishment of this journal we proposed merely to furnish a channel of communication between farmers, and a depository for the results of agricultural investigation, experience and observation. Except as one among the many who by their pens could contribute to that fund, we did not expect, and certainly did not promise, to sustain such a publication as the Farmers' Register was designed to be—or even as it is, with all its admitted defects. Yet we are left almost unaided to bear the burden, and the responsibility. All our brother editors of agricultural journals seem to suffer under a like privation, if we may judge from the general want of matter in their pages, though they are not so regardless of policy as to complain in this manner.

We have never tired under the weight of editorial labors proper, and would rejoice, even in regard to our personal comfort and happiness, to have that weight increased greatly, as it would be, by more numerous communications. But we are indeed wearied, despondent, and almost ready to cease our long-continued efforts, and labors which were our most precious possession, when we see so little evidence, in general, of sympathy and of approbation, or of the will to render assistance, from the great body of Virginian agriculturists, who ought to consider the Farmers' Register, in its highest state of usefulness, as the best means of promoting both their own individual and common interests.—ED. F. R.

INVESTIGATION OF THE EFFECTS OF MARLING.

For the purpose of obtaining from numerous and distinct sources opinions of the practical effects of marling, and especially of the oldest practice, we long ago prepared such queries as would embrace and exhibit the whole subject. These queries, together with a more fully explanatory circular letter, and remarks, were addressed to our readers generally, through the Farmers' Register, (at page 509, vol. v.) and also many separate copies were directed to particular individuals whom we had known, or heard of, as experienced in marling. The effort was vain. So very

few persons answered the queries, or made the slightest effort to aid the attempt, that no use could be made even of the little that was performed. But though the effort was necessarily abandoned for the time, the much desired object was still kept in view; and, at the earliest time that we have been able to devote to it our personal attention, we have commenced seeking the information desired, by visiting in person the farms of the most experienced, or the most judicious, and, therefore, successful marlers, and taking down from their own words the answers to the queries. This renewed effort has been, as propriety dictated, directed first to Prince George county, the place of our own former labors, and the earliest in Virginia of this kind, that were continued and extensive, except in one other place, James City county. We are now engaged in this work, and hope to present answers from Prince George county in the next number of the Farmers' Register. Thence, if with sufficient prospect of success, we propose to visit other counties where marling has been long and successfully practiced. We have been repeatedly and urgently invited to visit different regions with this view; and probably this announcement, if standing alone, might induce a renewal of such requests. We therefore say, in advance, that we desire much to visit some of the marled lands in all the counties where the improvement has been extensive, and where important facts in regard to the effects may be learned. But it is impossible for us to give to that object so much of our time and labor. Therefore, in selecting the fewer places for personal examination, we shall be in a great degree guided by the attention that may be yet given to the queries formerly published, and the answers sent thereto previous to our visits. If any one person in each county will take the trouble of asking for, obtaining and writing down answers from a dozen individuals, the work thus executed and stated in advance of ours, would be a sufficient inducement for us to visit the ground and the individuals, for the purpose of completing what the preparatory labor had so far and so well forwarded in execution. All that was formerly desired, and which, if now performed, would furnish all the valuable statistical information on this subject needed, and so important to the public interests, is that a number of experienced marlers should take a few hours to consider and recollect, and write down their answers to the queries, so far as their experience or observation affords materials. But as it seems that it is hopeless to expect this of even half a dozen individuals, it will serve nearly as well if *one person* only in a county has sufficient zeal personally to make the queries of his

experienced neighbors, whom he could meet all at once on a court day. But if the somewhat greater trouble of separate answers being furnished was so great as to prevent compliance, or if the importance of the object was not appreciated, then it will be as much in vain to expect any aid in this respect, from any quarter, or in any easier mode. We can only say that without such aid from others, we can do nothing. But if such good aid is furnished as well may be, at the expense of but a few hours' attention from a few farmers in each marling county, then we will venture to promise to digest from these a body of information which, for its authority as well as for its facts, shall be of very great value to agricultural interests, and especially to those of the great marl region of the United States.—ED. FAR. REG.

CRANBERRIES.

From the Maine Farmer.

The common cranberry is a native of Maine, growing spontaneously in many of our bogs and lowlands, and yet we presume that thousands of bushels are annually brought in from other states, and purchased by us.

We have found it growing near the coast, and have seen it also very abundant near the head waters of the Aroostook river.

There is no difficulty in cultivating them in the garden, if you have the conveniences for giving them a situation similar to the one which is natural to them. In England the horticulturists have succeeded in raising them in their gardens. Sir Joseph Banks describes his mode of cultivating them successfully. From a bed of 326 square feet three and a half bushels were produced.

It is necessary that they have a moist situation, and peat earth from bogs to grow upon.

Salisbury in the Horticultural Transactions gives the following directions for cultivating them in dry beds.

"The 'American cranberry,' says he, (*oxycoccus macrocarpa*), may be cultivated very successfully in situations not positively wet, if only planted in bog earth, which retains moisture longer than any other soil; for a few plants even in pots which had stood some time neglected under a hedge, so that their branches were matted together, produced a plentiful crop."

In situations where water is to be had freely, Neill observes, "all that is necessary is to drive in a few stakes two or three feet within the margin of the water, and place of some old boards within them so as to prevent the soil of the cranberry bed from falling into the water; then to lay a parcel of small stones or rubbish in the bottom and put the peat earth or bog earth over it to the depth of about three inches above and seven inches below the surface of the water.

In such a situation the plants grow readily; and if the few be put in they entirely cover the bed in a year or two by means of their long runners which take root at different points.

From a very small space a very large quantity of cranberries can be gathered, and they prove a remarkably regular crop, scarcely affected by the state of the weather, and not subject to the attacks of insects."

A writer in Loudon's Gardener's Magazine observes that the cranberry will succeed when planted as an edging to any pond, provided some bog earth, be placed for its roots to run in; or if a bed of bog earth be sunk in any shady situation, so as its surface may be below the general level, for the sake of retaining water, the plant will thrive well, and if watered regularly in dry weather, produce abundant crops.

In addition to the common bog cranberry, we have another one that grows on our highest mountains evidently seeking the coldest and most exposed situation that can be found. This is sometimes called the Scotch cranberry, and sometimes "Mountain cranberry." The botanical term is (*Vaccinium vitis idæ*.) The berry does not grow so large as the other, but it is a very pleasant tart. It may be found nestling among the moss and alpine plants of the White Hills and many other of the lofty peaks in Oxford County. This can be easily cultivated by giving it a bed of peat earth or moss in some cool shady situation.

Besides these, we have another fruit which is also called "cranberry," or more commonly "high cranberry." It is a species of viburnum, (*viburnum oxycoccus*), and is a very ornamental shrub and should be found in every gayden or dooryard. It is quite abundant in many parts of the state, especially in Oxford County, and on the Sandy river, Kennebec, Aroostook, &c. &c. It grows about ten feet high, and is easily propagated by the root or seed. We have also succeeded well in propagating it by cuttings, though these should be protected during the winter, as the roots do not acquire sufficient strength to hold the plant firmly into the sward, and there is danger of its being thrown out by the frost if there are not some leaves or straw thrown over them.

This shrub bears clusters of red berries which remain on the bushes nearly all winter. It is a pleasant acid and makes fine preserves. The only objection being the stone or kernel is rather large, in proportion to the size of the berry.

CLOVER IN CORN.

From the Farmers' Cabinet.

Sir—In a late conversation with a first-rate agriculturist, and a member of the state senate, I found that he is accustomed to sow a full crop of red clover in his corn, at the time of the last cleaning, laying the land as level as possible for this purpose; and he assured me he had always succeeded in obtaining heavy crops, without the least injury to the corn, and which, in its turn, shelters the clover by its shade, and encourages a very rapid growth. Will our friends try it by way of experiment the present season? It is believed that it may be made introductory to a new course of crops, which might relieve the country from that terrible scourge, blight, in all its different varieties, fly, rust, smut, mildew, &c., which is supposed in a great measure attributable to the present mode of cropping and manuring. D. H.

Philadelphia, June 24, 1840.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

POTATO PLANTING.

From the Farmers' Cabinet.

Sir—On a late visit, which I paid to an intelligent friend and excellent agriculturist, I found him in his field planting potatoes, after a method which I consider about as near perfection as may be desired; and the simplicity and ease with which it might be adopted for general culture are, to me, amongst its greatest recommendations. I speak with confidence when I recommend this mode of practice, for I have used it very extensively myself, and have found it the quickest as well as the least expensive, the easiest as well as the most certain mode of procedure, which I have tried or seen adopted. The only difference between my friend's management and that of my own was, he planted under a turf sod, with once ploughing, while I always plough the land designed for potatoes early in the autumn, deep, and well up, and so it lies until the spring: the after culture, and before I plant my crop, leaves me but little to do in the way of cleaning and hoeing amongst the crop, it being my plan to completely eradicate the weeds and pulverize the soil, before planting the potatoes, when double the labor in half the time, and at half the expense, can be given for the purpose.

His method after this was like my own—the surface of the land had been spread with half-fermented manure, and in a furrow which had been thrown out adjoining the fence, potato sets were dropped, at the distance of fourteen inches apart, and upon these the dung of the two next furrows in width was raked and spread carefully; the plough, on again passing, turning a furrow upon it and the sets, and making as good work as I ever expect to see. The next furrow had no potatoes planted in it, and no dung, so the sets were planted in every alternate furrow, and these had the whole of the dung: thus the work was finished in the easiest, quickest, and most perfect manner imaginable.

Now, in all other sod-ploughings for planting, I have been dissatisfied with the rough and uneven state in which the land had been left after the plough, and on which the harrows would operate to much disadvantage, and often to an injurious extent, pulling over the half-turned sods, which would require to be replaced by hand, and even then the work would be left ill done. My friend had, I believe I may say, *invented* a machine by which this inconvenience and injury were prevented, and for this, if it be his own invention, he deserves a premium—it was merely the iron tire of a broad wagon wheel, which was dragged horizontally on the surface of the ground by a longer or shorter chain, so as to elevate the front to a certain degree to enable it to work properly; and by this very simple contrivance, the surface was cut as smooth as it could have been by the hoe, and the pulverized earth was dragged and deposited in the hollows, as well as it could have been done by the shovel; the land being thus as effectually worked and levelled as by harrow and roller. The use of this very simple machine is

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calculated to save immense labor and time; but my friend could not be prevailed upon to communicate its use for the benefit of his neighbors; I have, therefore, undertaken to do it, conceiving that it ought to be made known for the good of the community.

In conclusion, I have known upwards of seven hundred bushels of potatoes grown per acre, by the above mode of planting, which required one flat hoeing only by hand for the destruction of the seed weeds—the root weeds having all been gathered and removed before planting the crop—they were not moulded in the slightest degree; and to this circumstance, in conjunction with careful management in planting, must be attributed the great yield of the crop, as also the quality, which was very superior, the bulbs being all of a good size, and not deformed by those knobs which are so common on those that have been raised by repeated mouldings—would our friends think on these things?

A SUBSCRIBER.

MAKING AND CURING HAY.

From the Farmers' Cabinet.

Mr. Editor—The season has now arrived when the farmer will be required to cut and put away his crops of grain and hay; his fields are to be unladen of their treasures, and his barns to receive the rich stores which a kind Providence has given in return for his labor and skill, and it is to be hoped that his toil and care will be rewarded with an ample harvest. As some notions have suggested themselves to me in relation to the making and curing of hay, and as this is the season when they can be made useful, and I have experienced the advantage of their application, I have determined to give them publicity.

In making hay, I have for several years made it a rule not to spread the grass (except when it is quite ripe) upon the day on which it was mown. In cutting, I found the butts of the grass were generally thrown by the scythe so as to be exposed to the air, and the tops were below or covered by the butts or thicker part of the stems; I therefore let it lie until the next day, in order to dry the butts as much as possible before spreading. I then have it carefully turned from the bottom, and spread after the dew is off and the swarth has become well heated from the action of the morning sun. If the weather is unfavorable, the grass is allowed to remain in the swarth, and the tops being still covered and entirely green, the swarth will remain exposed to bad weather for several days without taking damage. I therefore continue to cut in cloudy or even rainy weather, and frequently have a large quantity ready to spread when the weather is favorable. I cut when it rains, and make hay when the sun shines. When the stems of the grass are well wilted and warm from the action of the sun, the tops on being exposed will soon dry—much sooner, as you may suppose, than when the whole is in a green state,

in which case, in order to dry the whole mass, it must be subjected to frequent turnings. After spreading, I turn once in the morning, and in the afternoon throw the hay into wind-rows with forks, turning at the same time, and clean up between them with the horse-rake, with which I also clean up after the wagons. I prefer this plan of gathering the hay into wind-rows exclusively with the horse-rake, because it leaves the hay in a looser state for the wind to circulate through it, and is more easily handled when put into heaps or pitched upon the wagons. On the afternoon of the second, or the morning of the third day after cutting, if the weather is fair, my hay is usually fit to be hauled in. In mowing away my hay, I have it kept level, well trodden and well salted. Salt subverts several useful purposes: it prevents the hay from moulding; the hay need not come in so dry from the field as it is required to be when salt is not used. It retains a better color, and more of the fragrant and delightful aromatic odor, after being thus cured, and is a much more wholesome food for horses and cattle; besides, *I think it adds much to the fructifying principle of the manure.* As a proof of its value for the food of horses, I will state, that two of my horses died suddenly of colic: I thought they had been killed by bots, but upon a careful examination of their intestines, I could not discover a single bot or other worm, and I attributed this to the fact, that they had been constantly fed with salted hay—I have never had a horse to complain of bots since I have used it; and I do not doubt that the general health of my horses and cattle has been much promoted by the generous use of salt amongst them, and that their food is rendered much more pleasant to them by a moderate admixture of it.

In pursuing the method of curing hay which I have above recommended, I have not only saved much labor, but retained and secured all the valuable properties of my hay. As a proof of the superiority of my method, I will state, that a large proportion of my crop has been annually sold in the Philadelphia market for years past. My hay would always find a ready purchaser, no matter how much was in market, and I was always able to obtain for it the highest market price. K.

P. S. No liquor allowed in the field or the barn.

JOURNAL OF A RECENT VISIT TO THE PRINCIPAL VINEYARDS OF SPAIN AND FRANCE.

(Concluded from page 444.)

Friday, 11th November.—On paying a small fee to the health officer, I was permitted, under his guardianship, to walk to one of the neighboring hills. The soil consisted of nothing else than the rough debris of the granite of which they are composed. Towards the bottom of the hills the vines were planted in double rows, three feet apart, with a space between of thrice that width, which had just been ploughed for a grain crop. Higher up, the ground is entirely covered with vines and olives, planted with regularity wherever the ground permits; but on ascending higher, advantage has been taken of every spot where it was possible to thrust a plant among the rocks. These vines have been planted with great labor, as there

is scarcely soil enough to cover their roots; and terraces have been formed by small walls of dry stone, to prevent the little there is from being washed away. The vines were all pruned down to one or two knots on each mother branch, and each vine had from three to six or seven shoots, in proportion to their strength. Those among the rocks were in general very stunted, and must bear a very small crop. The olives, which they were now employed in gathering, were a small black variety, and I could not observe that they had suffered in the same manner as the olives of Andalusia.

Monday, 14th November.—Having yesterday been permitted to land, I spent last night in the posada at Roas, and proceeded this morning to Figueras, in order to join the diligence which passes to-morrow morning for Perpignan. This country though far from being naturally so rich, is in a much higher state of cultivation, and proportionally more productive than the south. Passing through the town I observed them carrying out from a cellar the refuse of a fermenting vat, and on entering I found they had just been pressing the skins which had fermented with the wine. Outside the cellar were two presses, each on wheels. These were composed of a box 2½ feet long, and about the same width and depth, formed by light bars, with stronger bars at the corners. Before and behind these boxes was a screw, and there was a spout to convey to a vessel placed below, the must which would flow through the bars to the bottom on the pressure being applied. It was evident that these were *itinerant presses*, which the proprietor was accustomed to send to the different vineyards as they were required. I found also that he had a more powerful press within the cellar, and that there also was a mill for grinding olives, much superior to the one I had seen at the Marquis del Arco Hermoso's. The basin of the mill consisted of an immense piece of granite, formed into a circle, and hollowed out in a sloping direction, leaving a space level at the bottom considerably greater than was required for the vertical stone to turn upon, as upon a pivot; and attached to the vertical stone was a sort of scoop which collected the scattered olives into the line which it passed over.

Tuesday, 15th November.—This morning at 9 o'clock I took my seat in the *coupé* of the diligence, for Perpignan. I found here an Englishman who was returning from an excursion to Madrid and Barcelona. The road passed through a valley in the direction of the Pyrenees, the soil everywhere cultivated like a garden. Here were immense numbers of olive trees of a very large size, underneath which grain crops are cultivated. Some of the wheat has almost covered the ground; but in general it is just making its appearance, and in many places the plough is still at work. On the hills the vines are cultivated in terraces, and not a spot is left unoccupied. Adjoining the road over the Pyrenees are every where to be seen the marks of the greatest industry; not a spot which is capable of cultivation is left untouched, and the mountain scenery is sometimes beautifully diversified by dwellings surrounded with trees of every kind, and enlivened by the verdure with which the mountain stream has covered its banks. The hills themselves are entirely destitute of herbage. After passing the town of La Jonquiere on the French side, the ground (although evidently of

a very meager quality) appeared generally cultivated with vines and corn. The vines appeared every where to be cultivated with great care. I remarked some new plantations; and, in one instance, a plantation of the preceding year had made so little progress, that I could scarcely persuade myself the vines were not the cuttings of the present year newly planted, with some of the leaves still remaining upon them. On questioning the postilion as to this point, he said that the plantation had two years, but the ground here was so very arid the vines made little progress.

Wednesday, 16th November.—Having called at the banking house of Messrs. Durand, who are agents for Herries, Farquhar and Co.'s notes, I took occasion to mention to one of these gentlemen the object with which I was travelling, and to ask his advice as to the best mode of seeing the vineyards near Perpignan. He said I could not have inquired of persons more competent to give me information; that they had considerable agricultural establishments in the neighborhood, and if I and my friend (the gentleman with whom I had travelled from Figueras) would accompany them the next day, they would be glad to give us every information in their power. After accepting this very liberal offer, with due expressions of thankfulness, I mentioned that I had heard of their eminence as agriculturists, and had I gone to Marseilles in the first instance, I intended to have procured an introduction to them. He replied that it was unnecessary; that if we were agriculturists we were their friends—that all agriculturists were their friends. It was accordingly arranged that we should accompany them the next morning in their carriage.

Thursday, 17th November.—Mr. Durand having recommended our starting at six in the morning; as the days were short, and we had more than one place to visit, we proceeded to their house at day-break. Both the brothers accompanied us. When we got clear of the walls of Perpignan, it was sufficiently light to enable us to make some observations as we passed. The olive is cultivated to a great extent on all sides. Mr. Durand knows only one variety, a large black sort, not so large as the La Reyna of Seville, but about as large as the largest of the other sorts cultivated there. Here, as elsewhere, the olive has this season been attacked by a worm, but it is attributed rather to a deficiency than an excess of rain.

The rain has this season been below the average in this district, and the country has suffered a good deal in consequence. The average annual produce of olive trees throughout the country is from fifteen to twenty pounds of oil; but there is every possible variety. A very fine olive, in a favorable year, will sometimes yield as much as 80 pounds. Such a misfortune as has happened this season is of rare occurrence. In planting they take a sucker from the root of an old tree, and keep it three years in a nursery; it is then transplanted, and in three years more it begins to give a few olives. In ten years it has become a largish tree, but requires many more years before it acquires all the magnitude it is capable of reaching. Many of the olives we passed had the greatest possible appearance of old age. They were so old, Mr. Durand said, that no one had any knowledge of their age. In general the ground underneath was cultivated with grain crops; the trees

are benefited by the manure, and the crop suffers only partially from the shade. We saw, however, some very fine trees planted from thirty to thirty-five feet apart, which overshadowed the ground so much, that grain crops could not be cultivated under them with advantage.

After a drive of about an hour and a quarter, we arrived at the first of Messrs. Durand's establishments. This is an immense square enclosure, with high walls and buildings. It formerly belonged to the Knights Templars. The church is converted to a wine cellar, and the houses of the Templars to the residences of Messrs. Durand's peasants. Several other buildings are also erected within the walls, forming altogether a most complete and extensive homestead. After taking chocolate, we proceeded to the vineyards. Mr. Durand only cultivates three varieties of vines, the Grenache, which gives sweetness, the Carignan, which gives color, and the Mataro, which gives quantity. His vines are in general planted either on the plain, or on a gently inclined slope; but when there is a slope, the exposure is always to the south. The soil is loose and stony, the stones quartz, of various colors and shades.

The stony and least fertile portions of the estate are selected for vines. Some of the cornfields are planted at wide intervals with olive trees, but there are none of these among the vines. The distance at which the vines are planted is always four feet, and the *quincunx* is preserved with the greatest possible exactness. The ground is ploughed twice a year; that is, immediately after the pruning, which is now going on, and in spring, after the vines have given shoots of 8 or ten inches in length. On both occasions, it is first ploughed in one direction and then cross ploughed. It receives no other labors during the year, and in summer, such is the strength of vegetation generally among the vines, that few weeds make their appearance, the ground being almost covered with the vine shoots. I was much surprised on finding that, with the exception of one field, the only preparation the ground had received previous to having been planted was a common ploughing. The cuttings were then put down in holes made by an iron bar or dibble, and left to shift for themselves. Many of them, as might be expected under such treatment, never came forward, and it requires six years before the vineyard is so well established as to yield a crop.

On learning this I had no difficulty in accounting for the small progress of the vines I had seen before arriving at Perpignan. There was a plantation of the Muscat of Frontignan, which was now six years old, but in much greater vigor, and with a much greater number of shoots on the vines than was usual. Having remarked this, Mr. Durand informed me that, in planting this field, he had caused a hole to be dug for each plant 18 inches deep by 18 inches long, and 12 wide, and had laid the cuttings horizontally into this trench, bending up the extremity where the plant was to grow. This, he said, accounted for the greater number of shoots from the greater quantity of roots. The produce, he said, was double what the ordinary vineyards yielded. The stocks are all extremely low, not more in general than six inches from the ground; but so well has the pruning been managed, that all the shoots are nearly vertical; stakes or props are thus quite unnecessary;

and are never used. Indeed, their use seems to be quite unknown throughout this district. The number of the buds or knots left in pruning was from three to six, according to the strength of the plant. They are universally pruned in the spur fashion. Having mentioned the system of alternate long and spur shoots, Mr. Durand's steward, who seemed to be a respectable and well-informed man, said that it would sooner wear out the plants. I told him of the precaution Mr. Domecq, of Xeres, intended to adopt in order to prevent the attacks of worms. He said that, however close the branch might be pruned, there was no danger of these worms finding their way to the heart of the stock, unless the stock itself were bruised or broken. It was, he said, by wounds or splits in the stock itself that the worms found access to it, and not by close pruning of the new wood. In this opinion I perfectly coincide with him. There are no worms in any of their vines, which are, indeed, all in the highest possible order.

The average produce of these vines is six *barriques* (hogsheads) per hectare; this is about 140 gallons per English acre; a much smaller produce than I would have expected from the general health and vigor of the vines, although it still continues a matter of surprise that they should produce at all considering the great hardness of the subsoil, and the slight hold of it which is originally given them. Part of the vineyard had already been pruned, and two men were busy in a part which we visited. There had been fourteen men employed the day before; but this was the *fête* day of the neighboring village, and only two of the men had come. It requires a man ten days to prune a hectare. The instrument which they use is contrived to give, in some degree, the purchase of a lever.

With the edge they cut with great care the shoots where a bud is left for the following season; but the superfluous shoots are chopped off with the blunt edge with very little ceremony. I took this opportunity to request that Mr. Durand would give me a parcel of cuttings of all the kinds of vines he possessed; and he immediately gave orders to his steward accordingly.

Between twelve and one o'clock we returned to the house, and after a substantial *déjeuner à la fourchette*, visited the wine cellar. Along the wall, on each side of the cellar, are arranged a number of large vats, containing from thirty to fifty *barriques*—that is, from 1800 to 3000 gallons each; the whole number was fourteen or sixteen. They were placed horizontally, with one end to the wall. Above them, on each side, is a floor or platform, which is on a level with a door that opens to the cellar from a higher side; by this door the grapes are brought in. On the platform are several troughs, about 10 feet long, by 2½ feet wide, with the side sloping inwards. Above the bottom of the trough there is a false bottom, perforated with holes, and divided by open spaces, which allow the liquid to pass to the true bottom, whence it flows, by a spout at the one end, into an aperture of about a foot square in the upper side of the vat underneath. While the men are treading the grapes in these troughs, they take out a portion of the stalks by means of a three-pronged stick, and after the grapes are pretty well broken, the whole contents of the trough are emptied into the vat. In the vat it is left to ferment, from 18 to

24 days, according to circumstances, and at the end of that period, the wine is drawn off to another vat, by means of a syphon and a pump. The *marc*, or skins and grounds, are then removed to the press, and the wine extracted from them is kept apart as being of inferior quality. In the end of each vat there is an aperture sufficiently large for a man to enter and clean it out. This is strongly secured by means of copper screws. After having been removed to a clean vat, the wine is kept in it till the following spring, when it is again drawn off the lees. When twelve months old, it is sent to Port Vendre, where Mr. Durand has very extensive stores and cellars; it is there mixed with 10 per cent. of brandy, and shipped for Paris. This is the ordinary description of Rousillon* wine, of the plain; but being made with more care than that of the smaller proprietors, it is the best of its kind. The wine of the hills is of a better quality.

Exclusive of the ploughing, which is done by their permanent servants, the management of the vines costs about thirty francs a hectare. The ploughing and the vintage may cost fifteen francs more—being, in all, about 16*s.* English an acre. The value of the produce is from 15 to 18 francs a *charge* of 26 English gallons; or from 180 to 216 francs per hectare—that is, from £3 4*s.* to £4 16*s.* per English acre.

After having walked into the garden, which was well stocked with fruit trees, we proceeded to the other property which Messrs. Durand proposed we should visit. This was entirely an irrigated farm. It consists of 240 hectares, 562 acres, and every acre of it can be laid under water when irrigation is required. This farm supports between 1,000 and 1,100 sheep, 114 head of cattle, and about a dozen horses, and there is always less than two-fifths of the land in pasture or green crops; the lucerne is cut five times in the season, and twice eaten down. The soil is a fine friable mould. In a field, where five ploughs were at work, it turned up in the finest possible condition. They were ploughing in wheat. Part of the field was manured, and part had been manured the preceding season. Messrs. Durand have an excellent breed of cattle; the working oxen as fine almost as any I have ever seen, although I have seen larger. In all the qualifications of depth and breadth of carcass, they were nearly perfect, with the line of the back perfectly straight, and the tail well set on. They were yoked with bows and yokes, the bows made of wood, which seemed to answer very well. The ploughs and carts were of the same construction as those generally in use in the country. The ploughman drove his pair of oxen with a goad fixed to the end of a long pole; on the other end of which was the small spade for cleaning the plough. They seemed to make excellent work, notwithstanding the rudeness of the plough.

The buildings on this farm were very extensive, and, though old, are now undergoing a thorough repair, which will leave them in excellent condition when completed. The stables and sheep houses are very spacious, as both cattle and sheep are housed every night. The lambs are always kept in the house, and the ewes are brought home

* Rousillon is the old name of the province which is now called Pyrenees Orientales.

to them three times a day. The lambs appeared all of the same size, and must all have been dropped within two or three days of each other. The wool was not of a quality that would be reckoned fine in New South Wales; and yet Mr. Durand says there is nothing finer in this part of the country. At the rate wools were selling in August this year, (1831.) it would bring, in London, about 18*d.* a pound. It is at present only worth about 7*d.* here, though two years ago it sold for 20*d.* A good wether will bring 10*s.* or 12*s.* They do not milk the cows, but allow the calves to suck them. There is no such thing known in this country as a dairy farm. Oil is the almost universal substitute for every purpose to which butter is applied with us, and milk is seldom or never used. There are, perhaps, few prejudices stronger than that of the English against the general use of oil, which they are accustomed to consider as a very gross kind of condiment; and perhaps there is no prejudice more unfounded. For surely the pure vegetable juice of the olive is far from being inferior, in delicacy, to butter, the animal fat of the cow; and there can be no doubt, that oil is also more wholesome and congenial to the human constitution, in a hot climate, than the latter. This district is not celebrated for the quality of its oil; but they do not as in Spain, consider rancidity a merit; and in the hotels it is furnished of very good quality, while the olives are quite delicious. Mr. Durand's working oxen are fed during the winter on hay of excellent quality, and are all in the highest condition. They have also potatoes, and sometimes turnips in winter. One set is worked from morning till noon, another set from noon till evening. I neglected to inquire what the average produce of wheat is on this farm; but on the farm first visited, where there was no irrigation, it was sixteen or seventeen bushels per English acre. The workmen are paid extremely well. The permanent servants of the farm have 150 francs, (\$23,) about £6 a year in money; 6 hectolitres (21½ English bushels) of wheat; 500 litres (120 gallons) of wine; 40 pounds of oil, and 20 pounds of salt, besides a piece of ground to plant vegetables and *haricots*, (the great dependence of the working people here,) and house room about the premises. The peasants and their wives and children are all extremely well clothed. Day laborers, at all seasons, receive 30 sous, about 14*d.* a day. In the harvest, mowers and sheep shearers, 2½ francs, and reapers two francs per day, besides their food; and Mr. Durand says, they make six meals a day at that time, and the quantity of food is almost incredible. About sunset we reached Perpignan, from which the last farm was three leagues distant, highly gratified with our excursion, and the kindness of our entertainers, who, to wind up their attentions for the day, had invited us to dine, and we now found a sumptuous dinner waiting our arrival.

Friday, 13th.—Messrs. Durand had been kind enough to say that they would give me a letter to their manager at Port Vendre, where they have a large establishment for shipping wines. I waited upon them to-day, and found it ready. Port Vendre is only about half a league from Collioure, which I had resolved to visit, as its environs produce the first quality of Rousillon red wine. At two o'clock I accordingly took my place in the diligence, and arrived at about seven at Collioure,

where I stopped for the night. From Perpignan in this direction (southeast) the soil is richer than I have elsewhere observed it in the neighborhood of Perpignan. Though there is here and there a vineyard, the land is generally under corn or meadow. Two or three miles before reaching Collioure the country begins to ascend towards the Pyrenees, on the tops of which, bordering the ocean, are still to be seen some towers built by the Moors when masters of this part of the country. No sooner do the hills begin to rise, than the cultivation of the vine begins also, and the first ranges of the mountains are covered with it to their very tops.

Saturday, 19th.—After breakfast this morning I walked over to Port Vendre, and waited upon Mr. Mas, the agent of Messrs. Durand. The road from Collioure winds from hill to hill along the shore. The hills are exactly similar in form and structure to those of Malaga: a shale or schist, with a slaty gravel, plentifully mixed through the soil. Mr. Mas conducted me over the hills in the neighborhood of the town, which are planted with great regularity and beauty in terraces from 6 to 18 feet wide, according to the slope of the hill. The terraces are made to follow the different curves taken by the hills, and are divided by channels, to allow of the passage of the water. It is a stated part of the labor to carry up the soil from the lower part of the terrace, where it has been stopped by the small stone walls, to the higher part.

In planting these hills they break up the ground only to the depth of eight or nine inches, and as they take up a great number of stones, the depth of the soil remaining is not more than six inches. They then bore a hole in the loose rock with a bar of iron, and thrust in the plant to the depth of 12 or 15 inches. I saw a plantation of the preceding year where almost every plant had succeeded, although none of them had given shoots of more than six or eight inches. Mr. Mas says it was formerly the practice in this country to trench and break up the rock to the depth of two or three feet, but (strange to say) they found the vines were sooner worn out, and they now follow the less expensive method. A hectare of middle-aged vines is here worth 1,000 francs. The greatest expense is in the first plantation, for it is universally necessary to build a series of terraces to support the soil. The value of a hectare with a good exposure, before planting, is 500 francs. There is, however, little ground in this neighborhood remaining to be planted, although the greatest portion has been brought into cultivation within the last 15 or 20 years. The average produce, according to Mr. Mas, does not exceed six charges the hectare, which is just the half of the vines of the plain. The annual expense of cultivation, including the vintage, is 40 francs, but the wine is worth 28 to 30 francs a charge, or from 168 to 180 francs the hectare. The distance of the plants is from three to four feet, and the pruning is, in every respect, similar to that of the vines of the plain. The varieties chiefly cultivated are the Grenache and the Carignan. The vines are never manured. The vines sometimes remain in the fermenting vat so long as 30 days. Like the wine of the plain, it is seldom drunk in its pure state, but is sent to Paris, with an addition of from 7½ to 10 per cent. of brandy, in order to be mixed with the lighter wines

of Burgundy and Orleans, to give them strength and color. The mixture of the brandy has, they say, a double purpose. It enables them to ship the wines when 14 or 15 months old, without risk of their turning sour, which could not be done for twelve months more without the admixture; and it enables the Parisians to mix a portion of water in order to reduce the wine in strength, and thus to save a part of the municipal duty which is levied on wines entering Paris. The latter is, I think, the only valid argument. Being desirous of procuring some of the wine of Collioure, Mr. Mas sent a person with me whom he was accustomed to employ in such matters, and after completing my purchase, I went with the proprietor to the vineyard where it was produced, and obtained four varieties of grapes which were not in Mr. Durand's vineyards. This vineyard was on the side of a very steep hill, and appeared to have been planted with great labor; the terraces did not exceed from eight to ten feet in width, and the walls were from two to three feet in height. He said the annual average from 500 plants was about two charges of wine. This, according to the distance they were planted, was rather more than double the quantity stated by Mr. Mas; but it was probably only a guess, although I am inclined to think the estimate of the latter was under the truth. There was, however, no way of coming nearer the true state of the case, for he knew neither the extent of the hectare, nor of the arpent. The wine of Cosperon, which is celebrated as a *vin de liqueur*, is the produce of a farm which was pointed out to me by Mr. Mas, under one of the hills which we passed over. It is, according to his account, nothing more than a mixture of brandy with the unfermented juice of the grape. After the grapes (of the Grenache kind) are very ripe, they are gathered and allowed to dry a few days in the sun; they are then pressed, and the juice is put into a cask, where it is mixed with a large portion, Mr. Mas thinks from a third to a half of its own bulk, of brandy. The brandy prevents the fermentation, the liquor retains the sweetness and flavor of the fruit; and this is the *vin de liqueur* of Cosperon, which has acquired a great name in the south of France.

Monday, 21st November.—Having returned early yesterday morning from Collioure to Perpignan, I found the Messrs. Durand had sent to my hotel nine bundles, containing fifty each, of nine distinct varieties of vines, and on visiting them at their house, I was again pressed to dine with them, but on this occasion excused myself. The kindness and attention of these gentlemen to me, a perfect stranger, without the slightest claim to their notice, is worthy of remark. They are the sons of Mr. Durand, the deputy for the province, and are now managing his affairs in his absence. Their mercantile as well as their agricultural concerns are of great magnitude. The latter they informed me yielded only about 5 per cent. upon the money invested, but they make no allowance for the value of the improvements, which were very extensive. Besides the properties I visited with them, the one consisting of 700, and the other of 560 acres, they had two other estates in the neighborhood of Perpignan, and all in their own hands. The irrigated land is worth 1500 francs (about £60) per hectare, the vineyards not more in general than one-third of that sum; but that por-

tion was, I believe, intended to represent the value of the land before planting. On one of the estates there is a handsome mansion, with extensive gardens, and a green-house. I was happy to promise that I would, in return for their attention to me, contribute to stock the latter by sending a packet of Botany Bay seeds, a present which I was glad to find would be highly agreeable to one of the brothers, who has a taste for horticulture and botany.

After having engaged my place in the diligence for Montpellier, (which was to start at seven in the evening,) I procured a guide, and proceeded to visit Rivesaltes, which is famous for producing the first sweet wine of France. Rivesaltes is a town containing about 3000 inhabitants, situated in the middle of an irrigated plain, about four miles from Perpignan. The vineyards are on the extremities of the plain, where there is a dry granitic soil; and on that portion which separates the meadow land of Perpignan from those of Rivesaltes, it is so thickly covered with stones of various colored quartz as to make it difficult to tread upon it. In many places where the vines appear to grow with great vigor, and to have attained a great age, the soil is of such a nature as would with us be considered absolutely sterile. They were very generally engaged in the vineyards in pruning and hoeing. The pruning was here, as elsewhere, universally in the spur fashion; from 3 to 7 or 8 knots being left on each vine, according to its strength. The stocks were in general close to the ground, and, indeed, where the soil was newly dug up, and gathered up into the form of a small ridge between the rows of plants, they scarcely seemed to be upon a level with it. I examined a plantation of young vines which had been planted last year, and found that more than one half the number had failed. Here also they never think of trenching the soil before planting; but after hoeing it the ordinary depth, they make a hole with an iron dibble and thrust in the plant. As they never afterward take the trouble to water them, it is not surprising that in so dry a soil so large a proportion of the cuttings should never take root. At Rivesaltes, for the first time in France, I observed them manuring their vines with strong stable dung, and I was informed that this was the usual practice here, although Messrs. Durand never used manure to their vines. The Muscat is the grape commonly cultivated, and by visiting different parties who were engaged in pruning, I obtained a few cuttings of this, and three other sorts; two of these four were entirely new to me; of two of them I had procured two or three cuttings each at Collioure.

The Muscat wine of Rivesaltes is made in the following manner: The grapes are allowed to hang upon the vines till they are so ripe that they begin to shrivel; they are then cut and left on the ground under the vines where they grew, for eight or ten days, unless the weather should prove unfavorable, after which they are pressed, and the juice is put into a cask, leaving the hung out; about a month after this, it is drawn off to a fresh cask, which is prepared by burning a match, not of sulphur, but of strong brown paper, steeped in the strongest brandy. They use this, they say, because the sulphur tastes the wine. The Muscat wine of Rivesaltes sometimes brings the proprietor 300 francs the charge of 118 litres (bottles) when

it is only from one to two years old. The produce of the vineyards of Rivesaltes was stated by the small proprietors, from whom I obtained the cuttings, to be about two charges for every 500 stocks, exactly the same as was stated by the person from whom I bought the wine at Collioure. I consider them both, however, as a very wide guess, for it was evident neither of them had been accustomed to reckon the produce in this way, and they neither knew the extent of the hectare, nor of the arpent. Many of the vines here seemed to require renewal, I would have been inclined to say owing to the quality of the soil, had I not seen the excellent condition in which M. Durand's vines were kept, in soil which was in some places not less stony and arid.

In filling a vacant space, when they cannot find a shoot on any of the neighboring vines long enough to reach the spot, they take the longest shoot there is, and lay it in a circular form round its own stock; the following year they raise it, when, with the shoot it has produced, they cannot only reach the spot to be filled, but have by this means a strong plant to fill it.

While noting above the use of a match with brandy instead of sulphur, there has occurred to my memory an observation stated by Mr. Mas, in reply to my question, whether they did not find the burning of sulphur in the cask to taste the wine? He stated that when this occurred it must be owing to a small quantity of water having been left in the cask when cleaned. When this was the case, the wine, he said, was sure to be tasted, because the sulphuric acid impregnated the water; but when every drop of water was carefully drained off before the cask was smoked, it never occurred.

I returned to Perpignan about four o'clock, and began to ticket the different bundles of vines, taking only 25 of each of the varieties sent by Mr. Durand, on account of their great bulk. This, and other little matters which required arrangement, occupied me so fully, that I forgot to send for my passport till it was too late to procure it for the diligence that night.

Tuesday, 22nd November.—My delay for another day in Perpignan allowed me to visit the *Bergerie Royale*, where the government keep a flock of Merino sheep for the improvement of the flocks of the district. As Mr. Durand had assured me that it was not worth my attention, I had given up thoughts of visiting this establishment previously, but on now applying to my landlord for a horse, he told me that before arriving at the *Bergerie*, I would come to the Royal *Heras*, or depot of stallions for the south. At less than a league from Perpignan, I accordingly came to the house and offices which had been described to me as this depot, and on riding into the yard, I was conducted by a groom to the stable. There are here 31 horses, kept by the government for the purpose of improving the breed in this part of France. They are chiefly cross-bred, and I remarked several very beautiful animals which were a cross between the Arab and the Limousin. There was a small dark brown Arab from St. John d'Acre, and next to him a thorough-bred Arab, produced in France. The latter was incomparably the finer animal, in many points resembling old *Model*, of New South Wales, but I think inferior to him. There was also the *Jennet* of An-

dalusia, and a number of Flemish horses, both pure and crossed with various other breeds. The Russian and Polish breeds had also their representatives on this side of the stable. On the other side were the breeds of Normandy, and an immense animal from Mecklenburgh, for improving, as they said, the working breeds. Of this kind there were three huge horses, which appeared to me ill proportioned to such a degree as to be almost monstrous. Further on was a splendid English racer, though with more bone and muscle than the horses bred for the turf usually possess. This horse stood higher than any other horse in the collection; he is named *Rembrandt*, and was purchased by the French government from Lord Seymour, at Paris, where he had distinguished himself upon the turf, and had been the winner of large sums. There was also an English horse of the little *Cob* breed, and between these stood some very fine saddle horses of the pure breed (I think) of Limousin. The charge made by the French government for the service of any of these horses is only six francs for each mare. They travel to the distance of from 30 to 40 leagues, and find their chief employment in the department of Arriege. Here there are few horses bred, the work being chiefly performed by oxen and mules, and the ass still maintaining its ground, though not to such an extent as beyond the Pyrenees. The services of each horse are limited to 45 mares; but notwithstanding the extreme cheapness of the charge, and the extensive district over which they travel, scarcely one of the horses covers this number during the season. The horses are fed at all seasons with meadow hay and ground barley. From the terrace behind the stables there is a rich view of the plain to the north of Perpignan, terminated on two sides by the Bassee Pyrenees, and on the third by the sea. It is said that there is here an extent of land, 10 leagues in length by six in breadth, all of which can be regularly irrigated by means of small canals and water courses which are cut in every direction. The distribution of the water is regulated by law. The old chateau of Roussillon, with its round tower, overlooks this beautiful plain. The habitations are still, for the most part, congregated in small towns and villages, but here and there a detached house is to be seen. The plain is covered with trees, which border the water courses in every direction. Among these the Lombardy poplar, only now assuming the tints of autumn, is conspicuous. Every field is separated by a row of trees, chiefly the willow. These, however, on a nearer approach, lose much of their beauty, from the practice of cutting them down every third year for fuel, leaving only the trunk about 10 feet in height, with the stumps of the branches, to produce fresh shoots.

The plain of Perpignan offers as strong a contrast as possible to the (naturally) much richer plains of Andalusia. Much may be owing to the difference of climate, and the greater facilities for irrigation; but much more is owing to the difference in the political institutions of the respective countries. The absurd law of Spain, which prevents the enclosure of corn or meadow land, strikes at the root of all agricultural improvement.

On arriving at the *bergerie*, which is a shabby looking cluster of old houses in bad repair, I was informed that the sheep were out at pasture; and on following the directions given me, I soon came

up with them. There are 160 rams, and about 300 females. Their wool is certainly much finer than any I had seen at Mr. Durand's, but still there are few of our sheeppholders in New South Wales, who could not show finer sheep in their flocks than the generality of them. The government make an annual sale of these sheep. The minimum price for the rams is 60, and for the ewes 40 francs. A very few of those offered sometimes go off at much higher prices, but the demand is not nearly sufficient to take off those that are disposable at the minimum price. I saw amongst them a Saxon ram, which had cost the government 600 francs. Running with the rams were a male and two females of the goats of Cashmere; the male was a very large animal, with long white hair; the females under the size of an ordinary goat, but they were both very young, the one being 18 and the other only 7 months old. They breed when under 12 months; the youngest of the two being expected to produce a kid in four months. After they are three years old, the shepherd said, (if I understood him right, which was no easy matter, from his Catalan dialect,) that they produce four kids annually. The fine Cashmere wool is produced under the hair, and is combed out in the month of May. The large male, they said, yielded from five to six ounces, and the females only two ounces a piece. The government, the shepherd informed me, possess 150 of these animals, which were formerly all here, but, with the exception of the three which I saw, they were removed to the interior. They were brought from Persia by a gentleman of Paris, who started with a flock of 1,600. only 150 of which he succeeded in bringing to France. They were purchased by the government at the price of 3,000 francs a head, and their produce were for some time offered for sale in this department, but found no purchasers. The price I either did not hear, or do not recollect.

Wednesday, 23d.—Last evening, at seven o'clock, I took my place in the diligence, the director having freely agreed to take me without any additional charge, and at seven this evening I arrived at Montpellier. In going into Beziers about nine o'clock this morning, I observed hoar-frost upon the grass where the sun's rays had not penetrated. The whole country from Beziers to Montpellier, on both sides of the road, is covered with vineyards. Between the former town and Penzenas the country is extremely beautiful even at this season. The hills are covered with olive trees, intermixed with vines but the plains with vines only. Detached habitations are every where thickly scattered over the country. The vine is cultivated even in the alluvial plains; and the immense size of some of the stocks, with the vigor of their numerous shoots, affords ample evidence that whatever may be the quality of its produce, the plant itself is no enemy to a rich soil. Notwithstanding the apparent richness of the soil, I observed them every where digging in large quantities of dung, and this, as well as the mode of pruning, indicated that they were more anxious for the quantity than the quality of the produce. The wines of this district are almost universally converted into brandy. The soil had the appearance of being calcareous the whole way from Beziers to Montpellier, in some places almost resembling the albarizas of Xeres, but on trial I found it argillaceous.

Notwithstanding the great luxuriance of the vines, and the strength and length of their shoots, still no supports nor props were used. Here and there I observed the shoots of three neighboring vines tied together to afford each other support; but even this practice was rare compared to the whole, which are allowed to spread as they will, and cover the ground in such profusion, as to make it in most places difficult to penetrate amongst them.

Thursday, 24th.—I this morning proceeded to the Botanic Garden, in the hope of finding some one who would give me information of the nature I required. My expectations were also a good deal excited by having heard from an Englishman whom I met at breakfast, that the professor of botany had there a collection of vines. I was not long in discovering this collection, which was numbered up to 560 varieties. I did not hesitate a moment to inquire for the professor, and to make known to him the object of my visit. He received me with great kindness, and asked many questions respecting the Australian settlements, in which he appeared to take a great deal of interest. He conducted me over the gardens, and through the conservatories, pointing out every object which he thought would interest me. The latter are very extensive, and in the most perfect order. Among other plants he made me remark the *Galactodendron*, the "tree of the cow, or milk tree," of Humboldt, which he said would undoubtedly grow in New South Wales. He also pointed out, growing in the open air, the *Caroubier* of Spain, the *Ceratonia Siliqua* of Linnæus, that yields a pod, upon which the mules are almost exclusively fed in the mountainous districts of Spain, and the south of Italy. This tree I had not so much as heard of. There was a small department separate for New South Wales plants, of which there was a considerable number. Finally, Professor Delisle told me, that I was not only welcome to cuttings of all the vines he had, but he offered me his correspondence for any thing he could in future supply. He also said he would make up a packet of seeds for our Botanic Garden. In return for such liberality, I did not hesitate to pledge myself to make him whatever returns our Botanic Garden could supply. He accordingly called for the catalogue of vines, which was partly printed, being a copy of the list of the *Ecole* of vines established in the gardens of the Luxemburg, at Paris, by Messrs. Chaptal and Bosc, when the former was Minister of the Interior. A great proportion of the numbers which had been left blank in the original, were filled up in writing. He gave directions that a copy of the list should be prepared for me, and that a man should attend me to take cuttings of the vines. I determined to take a duplicate of each variety.

Saturday, 26th November.—Having ordered a quantity of leaden tickets to mark the cuttings, and a couple of cases to contain them, I proceeded to the garden yesterday morning, and found that the man had already commenced to take off the cuttings. On examining those he had taken, however, I immediately saw the necessity of making the choice for myself, and I have accordingly been engaged all yesterday and to-day in choosing the cuttings. This evening, by the assistance of a second man, who dressed the cuttings as they were taken off, we had finished this part of the task, and commenced attaching the numbers.

Monday, 28th.—This day, at an early hour, I proceeded to the garden, expecting to have all the vines numbered and packed before the evening. In this, however, I was disappointed. While the workmen were at dinner I spent an hour with the Professor, who showed me his Herbarium, which appeared to me very extensive. Among others, he opened out some New Holland plants, which had been collected by Labillardiere, the botanist, who had accompanied D'Entrecasteaux in his voyage. In reply to my inquiries respecting the history of the vines, the object to me of greatest interest, he informed me, that about 12 or 15 years ago, when Messrs. Chaptal and Bosc had formed the gardens of the Chartreuse, adjoining the gardens of the Luxemburg, into an experimental garden, specimens of the different varieties were also sent to the Botanic Garden of Montpellier, but many of these never succeeded. He told me that he had found it very difficult to obtain from the chief gardener at Paris the different varieties which he required to fill up the vacancies occasioned by those which had failed; they always sent *chasselas*, *chasselas*, *chasselas*, though under different names. A great part of the collection had therefore been brought together by the Professor himself. Mr. Delisle told me that there was a similar collection of vines at Versailles, and there was also one at Genoa.

All this day was employed in attaching the tickets to the vines, and arranging them in bundles, which, from many of them being very crooked, was no easy task. From the 560 varieties I could only make up 437, the remainder being either wanting in the original, or as identical with some previous number. I had also employed the master gardener to send a man on whose judgment and honesty he could depend, to make a collection of all the vines cultivated in the vineyards round Montpellier. This man had, all his lifetime, been employed in the vineyards; and as he gave me a description of the qualities of each, I had no doubt whatever that his collection might be depended upon. Rejecting, from those he brought me, such varieties as I had previously procured at Perpignan, I was now enabled to carry the collection of vines of Roussillon and Languedoc, or Pyrenees Orientales and Herault, to 33. I here again reduced the number of Mr. Durand's vines, taking only 12 of each of them, as well as of those cultivated in the neighborhood of Montpellier. When I came to pay for their carriage from Montpellier to Nismes, I had no reason to regret this reduction.

Wednesday, 30th November.—It was half past 10 this morning, when the packing of the vines was finished, and at 11 o'clock I started with them by the diligence for Nismes. Before leaving the garden, I paid a farewell visit to its liberal director, Mr. Delisle. I now received from him a letter addressed to Mr. Frazer, the colonial botanist, at Sydney, and also one for myself. In both he expressed his wish to maintain a correspondence with Sydney, to reciprocate the exchange of seeds and plants. He also gave me an introductory note to M. Audibert, the proprietor of a very extensive and celebrated nursery at Tarascon, a small town situated on the left bank of the Rhone, which he strongly recommended me to visit. A fourth paper contained hints about the best mode of preserving the cuttings from frost and damp;

but on that subject he recommended me particularly to consult M. Audibert. Mr. Delisle had also waiting for me a packet of botanic seeds, which he had put up for the garden at Sydney; and a packet of seeds of the more useful trees, &c. for myself.

The Botanic Garden of Montpellier is only second in France to that of Paris. It appeared to me to be kept in very high order.

The weather has now become piercingly cold. On Friday and Saturday I found it very unpleasantly so in the garden, but on Sunday evening a strong wind set in from the north, and next day all Montpellier was wrapped in cloaks. The sloping glass roofs and windows of the conservatories were now all covered with straw mats, which were not rolled up till the sun had attained a considerable height.

The road from Montpellier to Nismes lies through a well cultivated country, producing chiefly vines and olives. The vines appear here to be cultivated for wine for the table more than for distillation. Their size and strength were less remarkable than on the other side of Montpellier; and although I saw several parties hoeing in the vineyards, I could nowhere observe them digging in manure. Here for the first time I saw the mixed cultivation of vines, olives, and corn, alternating in rows of different widths; and the vineyards are also very generally planted with olive trees. This seems to be the season for gathering the fruit of the latter. They place large ladders against the trees, and ascend to pull them, instead of beating them down with poles, as is the practice in Spain. The women are very generally employed in this way, and from all parts of the road are to be seen with small baskets slung round their necks, either perched upon a ladder, or mounted into the interior of the trees. Half way from Montpellier to Nismes lies the town of Lunel, which, with Frontignan, also in the same neighborhood, is famous for its sweet wines. These I did not, however, wait to visit, being now satisfied that whatever may be the case with regard to the quality of dry wines, it requires only a good grape, a hot sun, and a particular management, to make excellent sweet wines. A gentleman in the diligence informed me that the Lunel is only produced on one estate, but in this I think he was misinformed.

1st December.—The diligence for Tarascon not starting till half past eleven, I had time to visit many of the beautiful and highly interesting remains of Roman architecture which are to be found in Nismes. The cold, last night and this morning, has been excessive. I have seldom found any thing more keen and penetrating than the north wind out of doors, and the air of my chamber was almost intolerable till a large fire (for which the charge of two francs was made in my bill) had been some time burning. Even then, and with the assistance of a screen, it was still difficult to keep off the cold. The tiled floors are ill calculated for the winter, however suitable they may be for the summer temperature of these climates. In the morning the canal was frozen over, and there were pieces of ice of six cubic inches in thickness about the fountains.

I arrived at Tarascon about half past two o'clock, and having procured a guide, proceeded immediately to the nursery of the Messrs. Audibert, whom I found at home. The nursery is about a

mile and a half from the town. Messrs. Audibert expressed the greatest desire to be of service to me. One of the brothers conducted me through a great part of their nurseries, which are extensive, and apparently very well kept. He also insisted that I should remain for the night, and made up a packet of every variety of seeds which they could imagine would be useful in New South Wales. The elder brother, M. Urban Audibert, is a corresponding member of the Horticultural Society of London, and has, as M. Delisle informed me, a very extensive correspondence in all parts of Europe. His library is filled with books on all matters connected with rural economy and natural history, in all languages. I selected from their list of vines eight or ten varieties, which I either knew to be wanting in M. Delisle's collection, or conceived to be so valuable, that I was glad of the opportunity of making still surer of possessing them. These, being rooted plants, will afford the proof whether they or the cuttings are more capable of bearing the transport to New South Wales.

Having, according to the advice of M. Delisle, consulted Messrs. Audibert respecting the packing of the plants, he expressed his fear that without moss they would soon all die; for the north wind, he observed, caused dryness as much as the heat; his brother was accordingly kind enough to accompany me to the town, with a man who carried a bag of moss. The plants were unpacked, and the boxes lined with double oiled paper, to prevent the access of air, and the escape of humidity. The moss, after having been slightly watered, was stuffed in at the ends of each bundle of plants. The latter were then replaced, and the cases closed. This is the mode adopted by Messrs. Audibert in sending vine plants to Russia and other countries of Europe; and they were of opinion that this would be sufficient to protect the vines till their arrival within the tropics, when the warm weather would cause them to shoot, and it would therefore become desirable to sustain the shoots as little by the admixture of earth or sand among the cuttings.

Messrs. Audibert refused to receive any payment for the plants I had selected from their collection, although I insisted very strongly on paying the stated price, as well as for the time his workman was occupied. He furnished me with several copies of his catalogues; and as I had informed him there was an Agricultural and Horticultural Society in New South Wales, he expressed a strong desire to be put in communication with them. M. Audibert also furnished me with introductory letters to the Directors of the Botanic Garden, and of the Cabinet of Natural History at Marseilles.

I concluded these matters in time to join the diligence for Marseilles, which passed at half past two, having, by Mr. Audibert's advice, forwarded the cases containing the plants to Avignon, there to wait my return to that town.

I had several times endeavored, but without success, to ascertain the best mode of pickling or preserving olives. Mr. Audibert told me he had no doubt the innkeeper where I had left my baggage could inform me; and I took down from his dictation the directions, of which the following is a translation. The olives which he produced as preserved in this way were of an inferior kind, but

appeared very well cured. "To make a lie, take for each pound of olives a pound of ashes and an ounce of lime; boil these ingredients in water till the lie is neither too thick, nor too clear.

"When the flesh of the olives detaches itself easily from the stone, which happens about six or seven hours after their immersion, the olives are washed with clear water, and left to steep for about nine days, the water being changed at least once every 24 hours. They are then kept in water, strongly charged with salt, and seasoned with a few grains of coriander seed, to give them a good taste."

This recipe was scarcely finished at the moment it was necessary to join the diligence, and I had not therefore time to read it, much less to ask such questions as are necessary to make it fully intelligible. The lie is doubtless intended to free the olives from the bitterness natural to them when fresh.

Saturday, 3d December.—At an early hour this morning I arrived at Marseilles. My object in coming to this city was to visit the districts in its neighborhood, where the raisins and other dried fruits of Provence are prepared.

I lost no time in waiting upon M. Negrel Ferand, the director of the Cabinet of Natural History whom I found not only very ready, but extremely well qualified, to give me the information I required. He said that almost the only district where raisins were made for exportation was Roquevaire, which was his native place, and to which he gave me a letter.

M. Negrel Ferand has contributed the division that treats upon agricultural and rural economy, to a quarto work now publishing in four volumes, on the Statistics of the Provence of Bouches du Rhone.

Being anxious to obtain the volume which treated upon this subject, he told me that I could not purchase it without the others, and that the whole work was not yet complete; but he very good naturedly gave me his own proof sheets. This work contains a detailed classification and botanical description of the vines cultivated in the department of Bouches du Rhone, or Provence, to the number of 74. The whole number which exists is stated to be about 350, but the above are all that are considered valuable for cultivation. The most of the others are cultivated in gardens and nurseries, more as an object of curiosity than usefulness. Of the 354 varieties, 220 have been perfectly identified with those bearing the same names in the collection of the Luxemburg.

In speaking of the olive, M. Negrel Ferand said, that its mode of bearing is biennial; that is, that the young wood must be two years old before it bears fruit. This accounts for the pruning every two years, and the frequent deficiency in the crop every second year. He said it was a point on which there existed much difference of opinion, whether it were better to prune the trees partially every year, and thus to have always a quantity of bearing wood, or to prune them fully every second year, and have a full crop once in two years. In this part of the country the olive is subject to great injuries from the severity of the weather; a great part of the trees in a whole district being occasionally cut off by the frost of a single night. The roots still remain, however, and are not long in sending up strong shoots; but the trees in this

part of the country never attain to any great magnitude. When the crop of olives is very small, they are generally attacked by insects. The annual average quantity of oil produced from each tree is only about two quarts. The best oil for eating is extracted cold; what is extracted by warm water is used for burning, and for soap, and other manufactures. The oil of Marseilles is certainly more pure and beautiful than I have elsewhere seen it. The finest oil of France is produced at Aix, eight leagues north of Marseilles.

I walked with M. Negrel to the Botanic Garden, for the director of which I had also a letter. The garden is neither extensive, nor particularly well furnished. The conservatory is handsome, but is too large to be easily heated. The collection of plants is insignificant compared with that of Montpellier. I saw a swamp oak, a pretty large tree, and a splendid specimen of the caoutchouc, in the conservatory. A specimen of the latter in the open air had been killed by the frosts of the preceding week, notwithstanding its having been wrapped up with straw mats.

Monday, 5th December.—Having engaged a cabriolet and a guide from my *maitre d'hotel*, I proceeded at an early hour to Roquevaire; the distance is about 12 or 14 miles in an easterly direction. The road almost everywhere proceeded among steep acclivities, through a country which the industry of man has won from its original barrenness, and which is on all sides cultivated like a garden, with every variety of produce. The hills, or rather mountains, which bounded the horizon to the right, formed a very rugged and picturesque back-ground to this picture of industry. There is scarce a spot which, by any degree of labor, could be gained from the rocks, that is not under cultivation; and the same field frequently bears at the same time a triple crop; first is a triple or quadruple row of vines, then an open space from 6 to 12 feet wide, under corn or legumes; (and I could not but observe the garden pea several inches above the soil, and perfectly uninjured, notwithstanding the severity of the late frosts;) lastly, there is, with every third row of vines, a row of olives, and not unfrequently the whole is surrounded by a hedge of mulberries. The same system is pursued on the sides of hills so steep, that it is necessary at every 12 feet to have a wall three feet in height. Notwithstanding the natural ruggedness and poverty of this country, it appears to be every where teeming with a fine, healthy, and well fed population.

Between 11 and 12 o'clock I arrived at the house of M. Brest, the gentleman to whom, in the absence of the Mayor, M. Negrel had given me a letter. Besides being a proprietor of land, M. Brest is an extensive soap manufacturer and merchant; his premises are very extensive, and comprise a great variety of accommodation. In several of the rooms on the ground floor, women were employed in packing raisins into boxes and frails, similar in every respect to those used at Malaga, and the prices of the raisins appeared also to approach very near to those of that place.

The first quality is made from the *Panse* or *Passe*, a largish white grape, but by no means so large as some others. The skin is rather fine than hard; the bunches are sometimes very large, although M. Brest informed me, that they are reduced in drying to one-fourth of their original

weight. The second quality is from the *Arignan*; the raisins of this grape are equally well flavored, and keep as well, but are smaller. When the former are thirty francs the quintal of 100 pounds, the latter are only from 20 to 25. The third quality consists of the smaller and looser grapes of the others, which are packed in frails; they are worth from 15 to 10 francs per quintal. The raisins of Roquevaire are packed in boxes, containing 12, 25, and 50 pounds, as at Malaga; but between every two inches in thickness of grapes they spread a sheet of white paper. These raisins, M. Brest says, keep the whole year through. They are certainly, in every respect, inferior to the raisins in Malaga. Their preparation invariably consists in immersion in a boiling lie previous to drying. They do not appear to be aware that it is possible to preserve the raisins without this previous preparation. M. Negrel says, the effect of the lie, in which they are kept from 15 to 20 seconds, is to open very fine cracks in the skin of the grapes, by which cracks the moisture evaporates. The strength of the lie is of the fifth degree of Beaume's hydrometer, which is equal in specific gravity, at the temperature of 55 of Fahrenheit, to about 1.032. After having been dipped in this lie the grapes are spread out on *claves*, which consist of a number of reeds tied together, so as to form a flat surface of about seven feet by four. They are brought under cover every night, and if the season is fine they are usually sufficiently dried in five days, though in the latter part of the season it sometimes requires fifteen days to dry them sufficiently. The preparation of raisins commences about the 25th of August, and continues during the whole of September, and sometimes as late as the 1st of November. Those raisins are finest which are dried in the shortest time. The neighborhood of Roquevaire is the only part of France where dried raisins are prepared as an article of commerce; in other parts they are cured by particular individuals for their own consumption. The *Panse Musqué*, or *Muscat of Alexandria*, is also found in this district; but although M. Negrel says it is the identical variety which yields the Muscatel raisins of Malaga, and though he strongly recommends it to cultivators in preference to the others, it is very seldom made into raisins. M. Brest says, the thickness of its skin makes it very difficult to dry it in this climate. M. Negrel also says, that the *Panse Musqué* is less cultivated than the *Panse*, because it is very delicate in flowering, and frequently blights. He says, however, that this may be remedied by pruning it long, and cultivating it in a trellis; the common *Panse* also requires to be pruned rather long. The whole quantity of raisins of the first quality produced for sale in Provence, does not, in the average of years, exceed 4,000 quintals, (400,000 pounds.) According to M. Brest the preparation of raisins is nearly on a par, as far as regards profit, with the making of wine. During the continental war, when it was impossible to import the raisins of Malaga and Calabria, those of *Provence* were in much greater demand, and their cultivation was much more profitable.

M. Brest had also a large quantity of figs packed in boxes, and ready for packing. The preparation of these consists simply in drying them on the *claves* for four or five days after they are pulled. The flat form which most of them have

is given them in the boxes, each fig being separately pressed into the box. The larger and smaller figs are packed in separate boxes, and the finest quality is double the price of the inferior. Nothing can be more simple than the drying and packing of figs. M. Negrel Ferand describes sixty-seven varieties of figs which are cultivated in the department of Bouches du Rhone. He quotes two authors, *De Solier* and *Raymond*, showing how much the cultivation of this fruit had fallen off within the last two centuries. The former, who wrote in the 16th century, after describing the means then pursued in drying them, adds, "that those of the inhabitants who had least, could sell from 100 to 150 quintals," (from 10,000 to 15,000 pounds.) "Two centuries later," the latter says, "the quantity of figs which the inhabitants dried formerly was their principal produce, but now each proprietor only gathers about 40 quintals, (4,000 pounds,) not more than enough for the consumption of his own family!"

The next object which attracted my attention was a quantity of large earthen jars, capable of containing from 40 to 60 gallons each. These were filled with capers of different sizes, from the size of a small nut to that of a very small pea, or, rather, to half the size of a very small pea. The latter are called *Nonpareils*, and are worth 32 sous (16d.) a pound. The former, being the coarsest quality, are worth only 3 sous a pound. Between these extremes there are 8 or 10 different qualities, all varying in price according to their size, the smaller being always the more valuable. They are put into vinegar as soon as they are gathered, after the different sizes are separated by means of a succession of coarser or finer sieves; and they need no other preparation. I observed a quantity of olives spread out upon some *claires* on the floor; they did not appear to have suffered in any degree from the worm, as was the case with most of the other olives I had seen. Many of them still retained a greenish, or, rather, a whitish color, while the majority were either of a deep purple color, or perfectly black. M. Brest said, these light-colored olives, pressed separately, would yield a finer oil than the others, though less in quantity.

From the apartments where the dried fruits were in process of packing, M. Brest conducted me through his soap manufactory, which is on a considerable scale, soap being one of the most important manufactures of Marseilles, and being made chiefly with the inferior kinds of olive oil; thence to a saw-mill, turned by water, and finally, to a room heated by steam for the treatment of silk worms. M. Brest next took me through the plantation adjoining his buildings, to show me how the caper is cultivated. At present the bushes are all covered with soil to prevent them being destroyed by the frost; and preparatory to this they had been pruned down to the length of from 6 to 12 inches each branch or shoot. In the spring they are cut down close to the stock, so that every year produces new branches. The bushes which yield the caper, if well treated, will last for 40 years. They yield on an average one pound and a half of capers, though some of the very strong bushes will occasionally yield from five to six pounds. The caper is the flower bud before its developement; the largest and least valuable grow near the bottom of the branch, the smallest at the top. They are gathered by women at the expense of a half penny

a pound. The bushes are about four feet apart; they are propagated by means of offsets from the roots, two of which offsets were presented to me by M. Brest. On opening the box which contained these offsets in London, I had the mortification to find that they had both perished. Having expressed my desire to procure cuttings of the grapes which are dried for raisins, and of any other sort cultivated in the district which I had not already procured, M. Brest sent a boy to conduct me to a property of his own, with a message to the *fermier* to give me the different kinds I wanted. He observed that he would have accompanied me himself, had he not been very busy picking up a quantity of fruits which were required to be sent off immediately. The whole of the ground over which I went is cultivated like a garden. In many places the vines are only planted along the edges of the terraces, which are every where built to support the soil. The caper is very generally cultivated in this district. The *fermier* was not at home, but soon arrived. He gave me cuttings of six new varieties, a dozen of each. The vines are pruned, leaving on each shoot two buds, exclusive of the one at the junction. These are the vines which yield the grapes for drying; there were from two to three shoots on each vine pruned in this manner. The *fermier* said, that each vine produced from 8 to 12 bunches. According to M. Brest, the ground in this district is all trenched to the depth of 2½ or 3 feet before planting, but they do not put in the cutting the whole of this depth. M. Negrel states, that it has been observed that the roots come from the two buds nearest to the surface only, and that the lower part of the cutting imparts to the remainder a portion of its decay. There is a good deal of sweet wine made in this neighborhood, chiefly from a variety of the Muscat grape. The wines of *Provence*, or Bouches du Rhone, are not celebrated, nor do they appear to be known as well as they deserve to be. They have never furnished many choice wines for commerce; but M. Negrel says, many proprietors make them of excellent quality, when they take some trouble to have them good for their own consumption. I returned, after an excursion of an hour and a half, to the house of M. Brest, who pressed me to remain for the night, and return to Marseilles next day; but this kindness my anxiety to get forward induced me to decline; and, after partaking of some fruit and wine, I returned to Marseilles.

Tuesday, 6th December.—During the course of this day I visited M. Negrel. He is now engaged in removing the collections of Natural History to a new Museum. I was happy to be able to promise that I would send him from London a stuffed *Ornithorhynchus paradoxus* and a few shells. M. Negrel is only *pro tempore* director of the Cabinet of Natural History at Marseilles; Mr. Roux, who holds that appointment permanently, being at present travelling in the East Indies with a German naturalist. M. N. said it was probable they might visit New Holland, in which case he recommended them to my attentions. Through the kindness of Mr. Gower, an English merchant, to whom I had brought a letter of introduction, I procured letters to Valence, to the neighborhood of Beaune, and to Dijon; the first in order to enable me to visit, with advantage, the vineyards of Hermitage, the two latter, those of Burgundy. I then procured, for the purpose of planting in New South

Wales, a quantity of very fine fresh dates, three varieties; the first was called the date of Oran; the second, the Muscat date: both of these were from Tunis. The third was the common date of Barbary, to which they attach little value.

Wednesday, 7th December.—This morning, at seven o'clock, I quitted Marseilles for Avignon, where I arrived at eight in the evening. The whole district from Marseilles till within a few miles of Avignon, is, to all appearance, of the most sterile description, though every where cultivated with the greatest care. Aix, about 20 miles from Marseilles, is celebrated for the quality of its oils; but from this town, onwards, the olive becomes more rare, its place being taken, in general, by the mulberry. The plain round Avignon is said to be one of the richest in France. At Avignon I found that there is a regulated price at which the diligences are accustomed to take merchandise, much lower than they charge for the additional baggage of a passenger. I accordingly agreed for the carriage of the two cases of vine plants to Lyons.

Friday, 9th December, Valence.—Having joined the diligence for this place late on Thursday evening, I arrived about seven this evening, and immediately proceeded to the house of the merchant for whom I had brought a letter. I was informed that he was then from home, and it would be very late before he returned. I was, therefore, prevented joining a diligence which was to proceed to Tain at eight next morning. After quitting Avignon I saw no more olives, but the mulberry was most abundant on all sides; and every person with whom I have spoken on the subject, including Messrs. Durand, Professor Delisle, Messrs. Audibert, Negrel, and Brest, concur in representing the rearing of silk worms as a most profitable pursuit. M. Audibert said, that many persons in their neighborhood who had mulberries did not themselves rear the silk worm, but disposed of the leaves to others. The ordinary price given for the leaves of a good sized mulberry tree was from seven to eight francs; and if the leaves happened to be scarce, so much as 10 or 12 francs have been given. They do not begin to strip the trees of their leaves till they are five or six years old.

Saturday, 10th December.—The gentleman to whom I brought the letter was not himself a proprietor of vineyards at Hermitage, but was requested to introduce me to some person having a vineyard there. On waiting upon him this morning, I found a letter prepared for me, addressed to Messrs. Richard and Sone, who are eminent wine merchants and bankers in Tournon, a town on the opposite side of the Rhone to Tain, and joined to it by a suspension bridge. On receiving this letter, I hired a vehicle to carry myself and my baggage to Tain, which is a small town, situated on the left bank of the Rhone, on the plain which lies immediately between the hill called *Hermitage* and the river. On presenting my letter, and explaining in general terms the object of my visit, I entered into conversation with Mr. Richard, senior, relative to the wines of Hermitage. The greatest part of the finest growth is sent to Bourdeaux to mix with the first growths of claret. Messrs. Richard are themselves proprietors of part of the hill of Hermitage, but not of that part which yields the finest wines. They are also wine merchants; but like the Messrs. Durand of Perpignan, they

sell it only on the grand scale. One of the sons who manages this department, conducted me over the cellars. The press is more complete than any I have yet seen; the screw is of iron, and from the closeness of the worm, must be of immense power. It is raised in the centre of a square trough, about seven feet in diameter. The female screw is covered by a horizontal wooden wheel, the spokes of which project over the sides of the trough, and are finished off so as to afford a convenient handle for the workmen. At the height of a foot from the bottom of the trough, on the outside, there is a circular stage projecting from its sides for the workmen when filling the press, and turning the wheel. The sides of the trough only rise to the height of this stage. The grapes, without any previous treading, are built up in the trough to the height of the screw, and when the latter is turned, the *must* flows from spouts which issue from the bottom of the trough at each side. When the sides of the mass which may have been pressed out so far as to escape from the action of the press have been cut off with an instrument resembling a hay knife, and the press has been raised so as to receive this additional quantity, and again put in operation, the process is complete; not a drop of *must* remains in the *marc*, as the mass of skins and stalks is called. The *marc* is disposed of, and employed to produce a bad brandy; for this purpose it is soaked in water to extract any saccharine matter which may remain, and the fluid which it yields, when again pressed, is fermented and distilled. To my astonishment, M. Richard informed me, that by one charge of this press they could obtain 40 casks of wine, of about 50 gallons each. As the *must* flows from the press, it is conveyed to the casks, where it is suffered to ferment from five days to a month, according to the strength of fermentation, the casks being always kept full to permit the scum to escape. When the first fermentation is decidedly finished, the wine is drawn off into a clean cask, which has been previously sulphured. This is the whole process of making the white wines of Hermitage. They are more or less sweet, according to the proportions of sweet and dry grapes which have been united in producing them; for they are all made from two varieties, the *Marsan* yielding a *must*, which, by itself, would give a sweet wine, and the *Rousette* a *must*, which, by itself, would yield a dry wine.

The white wine of Hermitage, even after having undergone the complete fermentation above described, still retains a disposition to effervesce when put into bottle. It is said to be without question the finest white wine of France, and will keep for 100 years, improving as it gets older; and when very old, acquiring a similarity to the white wines of Spain.

For fermenting the red wines, Messrs. Richard have two vats each capable of containing 16,000 gallons. Every day, as the grapes are brought from the vineyard, they are trodden in troughs, and then emptied into the vats; and while the vats are filling, a man gets into them once a day to tread down the surface. The object of this is to prevent the surface from becoming sour by exposure to the air, and to render the fermentation as equal as possible through the whole mass. When it becomes too deep for a man to tread it to the bottom, he suspends himself by the middle from a

plank across the vat. The duration of the fermentation is very uncertain, depending upon the state of the weather, and the ripeness of the grapes. Messrs. Richard ferment the finest grapes in one vat, and those of an inferior quality in the other. I tasted the wine of both vats of the last vintage; the first was made of the best grapes, which were also gathered in dry and warm weather; the second quality was made from the inferior grapes, and from others which had been gathering during rain and cold weather.

The fermentation of the first was over in five days, and its present value is 300 francs the cask of 210 litres, (that is, about as many bottles;) the other continued fermenting in the vat for twenty days, and its present value is only 80 francs for the same quantity.

The finest clarets of Bourdeaux are mixed with a portion of the finest red wine of Hermitage, and four fifths of the quantity of the latter which is produced are thus employed. The wines are racked off the lees in spring, and sulphured. A very small piece of sulphured match is burnt in the casks intended for the white wine; the red wine requires a greater portion. These matches are purchased from persons who make a business in preparing them. They are slips of paper, about one inch and a half broad, and when coated on both sides with sulphur, are about the thickness of a sixpence. A piece of one inch and a half square is sufficient for a cask of white wine containing 50 gallons.

On returning from visiting the cellar of old wines, which is under the other, I found one of M. Richard's sons in the office, who had been 12 months in England, and spoke English very correctly. He took me to visit one of the largest proprietors of the part of the hill of Hermitage, which produces the best wines. We found him at home, and walked with him to two of his vineyards. The hill of Hermitage is so called from an ancient hermitage the ruins of which are still in existence near its top. It was inhabited by hermits till within the last 100 years. The hill, though of considerable height, is not of great extent; the whole front which looks to the south may contain 300 acres, but of this, though the whole is under vines, the lower part is too rich to yield those of the best quality, and a part near the top is too cold to bring its produce to perfect maturity. Even of the middle region, the whole extent does not produce the finest wines. M. Machon, the gentleman whose property we were traversing, pointed out to me the direction in which a belt of calcareous soil crossed the ordinary granitic soil of the mountain, and he said it requires the grapes of these different soils to be mixed, in order to produce the finest quality of Hermitage. I took home a portion of the soil which he pointed out as calcareous, and the degree of effervescence which took place on my pouring vinegar upon it, indicated the presence of a considerable portion of lime. It is probably to this peculiarity that the wine of Hermitage owes its superiority; for to all appearance many of the neighboring hills on both sides of the Rhone present situations equally favorable, although the wine produced even upon the best of them never rises to above half the value of the former, and in general not to the fourth of their value. A good deal may also be attributable to the selection of plants. The best red wines of Hermitage are

made exclusively from one variety, and the white wines from two varieties; but in the district generally a much greater number of varieties are cultivated. The red grape is named the *Ciras*.^{*} The white varieties are the *Rousette* and the *Marsan*. The former yields by itself a dry and spirituous wine, which easily affects the head; the plant produces indifferently. The latter yields a sweeter wine. They are mixed together to produce the best white Hermitage.

The labor bestowed upon these vineyards is immense. According to M. Machon, on their first plantation, and every time the plantation is renewed, the soil is dug to the depth of $4\frac{1}{2}$ or 5 feet. In most places it is also supported by terraces. This was the first place, in the course of my journey, in which I observed any supports given to the vines; but these were simply a stake of about five feet in height to each plant, and the shoots were tied together at its top; for from the care indicated by the small trellis of the Medoc vineyards, this part of the labor seemed to be performed in the rudest possible manner. M. Machon informed me that the vines require constant attention to keep them in bearing, and whenever a vine is observed to be weak, or to yield a poor crop, it is dug out, and its place supplied by a *provin* from the strongest vine in its neighborhood. I saw this operation commenced and completed. A vine which appeared weaker than the rest was dug out, and a trench of about two or two and a half feet deep was opened up between it and the nearest vine in the adjoining row. This vine bore three vigorous shoots; the stock was carefully bent down till it was laid flat along the bottom of the trench; a quantity of dung was next put over it, and then some soil; of the three shoots, the least favorable from its inclination was cut off; one of the two remaining was bent back to the original position of the stock, and there fixed by the covering in of the soil; the other, in like manner, was bent in the opposite direction to fill the place of the plant which was dug out. It was evident that this is a very different process from that of filling a vacant space by bending the shoot of an adjoining vine into the ground till it issues at the place where it is intended to grow, and afterwards, when it has acquired sufficient strength, cutting off its connexion with the original; the stock actually became the root of two distinct vines, and their connexion is never destroyed. This process had taken place with a considerable portion of the vines this season, and a portion of them are annually treated thus: Into each trench was put rather a large basket full of stable dung, mixed with soil. On my expressing great surprise that dung should be used at all in a vineyard of such reputation, as I had always understood, that though it added to the quantity of the wine, it injured its quality, and often gave it a bad flavor, the proprietor said, that without frequent and strong manuring the vines would scarcely yield any thing; and that provided horse or sheep dung only was used, there was no danger of its giving the wine

^{*}In the *Enologie Française*, a very minute and correct account of the French vineyards, published in 1826, the name of this grape is spelt *Scyras*; and it is stated that, according to the tradition of the neighborhood, the plant was originally brought from Shiraz in Persia, by one of the hermits of the mountain.

n had flavor, though the contrary was the case if the dung of cows, and still more that of pigs, were made use of. M. Machon gave me 12 cuttings, the number I requested, of each of the three varieties of vines. He strictly charged the vigneron to select them from young vines; he said it was with the greatest difficulty they could get the vines to last 30 years, and they would not last more than half of that time, if they were not taken from young vines, that is, from vines of five or six years. The vines of Hermitage are planted at the distance of only $2\frac{1}{2}$ feet from each other, and are pruned differently from any I have before observed. They are not anxious to keep the stocks low, as in the south, but many of the older among them are 18 inches, or two feet in height. In general there is only one mother branch, and one shoot only (very seldom two) is pruned to yield the shoots of the season; on this shoot are left from 3 to 8 buds, according to its strength, and from 8 to 10 bunches is the average produce of each vine. However loosely the bearing wood of the season appeared to be tied up in a tuft at the top of the stake, M. Machon showed me that the portion which had been left of the last year's wood was carefully bent down in a circular form, and thus fixed to the stake. This, he said, was to prevent the sap from shooting up with too great force to the top. The average produce of M. Machon's vineyards is from 10 to 12 casks, or about 500 gallons per hectare; that is, from 210 to 260 gallons per English acre. The soil appeared to be of great depth, and full of small stones and gravel, but still there was every where a large proportion of good vegetable mould. An observation made by M. Machon was, that the wines of granitic soils soon acquire their maturity, and were in general very pleasant wines for the consumption of the country where they grew, but seldom kept well.

Before parting, M. Richard asked me how I had in general been treated by his countrymen, and he appeared much gratified when I told him that the attentions I had uniformly met with far exceeded either what I did expect, or had any right to expect. Indeed, I have often reflected how ill placed was the reserve I was advised to use about the objects of my journey, when in the Bordeaux country in 1822. I was then told, that if these were known, it would excite the greatest jealousy wherever I should go, and that I would be thwarted and misled in every possible way. On the present occasion I had no advisers; and acting upon the impulse of my own disposition, I uniformly prefaced my request for information with a statement of the object for which it was required. So far, however, from having been in any one instance ill received or misled, I have found every person to whom I applied anxious to forward my undertaking. M. Richard expressed a hope, that if I published an account of my journey, I would give his countrymen the credit to which I considered them entitled.

Wednesday, 14th December, Beaune.—After quitting the vineyards of Hermitage, there was nothing which I was desirous of examining, till my arrival in Burgundy, and I accordingly made the best of my way to this town, which is in the centre of the *Cote d'Or*. Spending only one day in Lyons, which was still in a state of ferment from the disturbances that had taken place three weeks be-

fore, the road from *Chalons sur Saone*, whence I took my departure this morning, and Chagny, a small town, where commences the range of hills called *Cote d'Or*, was crowded with people driving cattle and pigs; a gentleman who was with me in the diligence said they were going to a fair at Chagny. I observed a number of very fine working oxen, in pairs; they were yoked by the head, and appeared perfectly docile. My companion said they were worth from 300 to 400 francs a pair. I had a letter of introduction addressed to Rully, near Beaune, and I never doubted that I should find it within a mile of that town. On making inquiry, however, in which direction I must proceed, I was informed that Rully was 13 or 14 miles distant, and that I had passed it by on the road from Chalons. After some hesitation, I resolved, as the weather was extremely wet, to content myself with seeing the vineyards nearer Dijon, to which town I had also a letter. After waiting a couple of hours in hopes of better weather, I procured a boy to conduct me in the direction of Pornard, the nearest vineyard to Beaune which has any celebrity. After leaving the town, however, for about half a mile, I became tired of walking through the mud, which was in many places ankle deep, and turned aside to join some men who were at work on the road side. The first thing which had struck me on seeing the vineyards of Burgundy, was the extreme closeness and feebleness of the plants. These men were employed in planting. They opened a small furrow with a spade, only one spit, or about 12 inches deep, and about 9 inches wide at the bottom. The furrows were $2\frac{1}{2}$ feet apart, and the plants were placed in them at the distance of 14 or 15 inches; the lower end of the plant was placed across the bottom of the furrow, and bent up at one side; a quantity of dung was placed above, and then the soil was covered in, and the plantation finished. They told me that after these vines were three years old, the strongest of them would be selected to fill another row between each of the present row, by the system of *provignage*, the same as I had seen at Hermitage; and thus a space of 15 inches only would be left between each plant in every direction. The vines adjoining had not more space allowed, although the soil appeared exceedingly fertile. They said it would yield a good ordinary wine, but not a fine wine.

The plain between Cagny and Beaune, lying to the southeast of the range of hills, which, from the value of their produce, give the name of *Cote d'Or* to the department, is extremely rich, and to all appearance capable of yielding golden harvests of corn, as the hills do of wine. The greater portion of it, however, was planted with vines on both sides of the road. Near Cagny it appeared lighter, with a larger admixture of stones, and on approaching Beaune, it was a rich brown loam. A portion of the soil taken from where the men were planting was very slightly calcareous. Towards the top, the range of hills, which are of no great elevation, not nearly so high or so steep as Hermitage, was not planted, but seemed to be in a state of nature, or in pasturage. The hill of Hermitage was planted to the top.

Thursday, 15th December, Dijon.—Having joined the diligence at ten last night, I arrived here at three this morning. After breakfast I proceeded to the house of the merchants to whom I had

brought a letter from Marseilles, but found they were both from home; neither was there any person belonging to their establishment who could in any way forward my views. I applied to the innkeeper; and after telling him the object of my journey, inquired if he were acquainted with any of the proprietors of the best vineyards. He said yes; that he could give me the address of a proprietor at Gevray, and also of the proprietor of the Clos Vougeot. The day was, however, too far spent to proceed to either of these places. I therefore walked through the mud to the nearest vineyards, and entered into conversation with some of the people whom I found employed in them. The place I visited was a gentle slope, with a southeast exposure. The soil seemed good, and at the same time perfectly loose and full of gravel. It belonged to the mayor of the town, and produced, the man said, a fine wine; by which term the French characterize, generally, those wines which are drunk pure and in wine glasses, in contradistinction to those which are drunk in tumblers mixed with water at their ordinary meals. If, however, I had sought a reason for the wine not having a high name, I might perhaps have found it in the quantity of strong dung he was adding to the soil, and to the mixture of different kinds of vines, the *infamous gamé*, as it is sometimes called, holding a considerable place. He was busily employed in the *provignage*, which seems almost the only work going on at present. He had commenced the same morning, and had dug about twenty trenches, three or four feet long by about two feet wide. In each of these were half a dozen *provins*; that is, the ends of the shoots which belonged to the stock that had been buried in the trench. These trenches are never more than half filled, as the shoots are never sufficiently long to come up to the level of the surface. From this circumstance the whole of the vineyards of Burgundy are full of these holes at irregular distances, and have a rugged and unworkmanlike appearance. I remained while he completed two of these trenches, and he endeavored to explain to me the process; but all that I could comprehend was, that the shoots were so disposed as to preserve the alignment, although it would have been very difficult to point out which way the alignment lay. For this purpose the stocks and roots were twisted, and the different plants laid across each other in every possible direction. At a little further distance, another man was employed in rooting out a vineyard, which he said had been neglected some years before, and which it had been found impossible to reduce to order. The plants were literally crowded to such a degree, that it was almost impossible to set down the foot without treading upon some of them. Before it should be again planted with vines, it would, he said, be laid down for three or four years with sainfoin. This is a common preparation of the soil for vines in this district, and seems to be almost considered equivalent to a trenching. He said that, for a poor man, the *gamé*, or as it was generally called, the *large plant*, was undoubtedly the best kind of vine, the quantity it yielded was so much greater than the other; and, to a poor man, the quality was not so much an object, for the large proprietors and merchants would never acknowledge his wine to be a fine one, and it was very difficult to sell it for a high price, however good.

He said that, in that soil, the large plant would yield eight pieces of wine on a plot of ground 78 paces by 24, (the extent of that he was working.) This is little more than the third of an acre, and is more than 1000 gallons per English acre. It would require, he said, to be occasionally manured. The manure gave a slight flavor to the wine for the first season only; but as only a part of the ground was manured each season, the bad flavor of the part was not observed in the whole. The soil of this vineyard effervesced very strongly with an acid.

Friday, 16th December.—Having engaged a cabriolet from the *maitre d'hôtel*, I proceeded at an early hour this morning for Gevray and Clos Vougeot. It was a retracing of part of the road by which I had arrived from Beaune. The appearance of the range of hills is almost in every respect similar to what it was from Cagny to Beaune, but towards the top it was more generally covered with wood. On both sides of the road the soil also appears similar, but on the north side it is in most places evidently too moist for the vine, and is under cultivation with corn. The young wheat looks healthy and vigorous, but is not nearly so far advanced as in the south. The country is thickly peopled along the whole range of the Cote d'Or. There are said to be fifty villages between Dijon and Beaune, a distance of twenty-six miles. Some of the villages are of very considerable extent, and the houses are in general large, and all whitewashed and in good order.

The village of Gevray is about five miles from Dijon. In its immediate neighborhood is the small vineyard of Chambertin, as well as several others which yield wines scarcely inferior, though less known to fame.

The person to whom my guide was desired to take me, was a merchant as well as a proprietor. He said he would, with the greatest pleasure, give me all the information in his power, and he made some general remarks upon the requisites which must concur to afford a good wine. But he said that the postilion had informed him that he was also directed to take me to the Clos Vougeot, where I would find the confidential manager of M. Ouvrard, the proprietor, who could explain much better not only the management of the vineyard, but the making of the wine, for it was the largest and best managed vineyard in Burgundy. In the mean time, as I had expressed a desire to see Chambertin, he procured a vigneron, who, he said, was a very intelligent man, and would conduct me to it. Chambertin lay in the direction of Vougeot, but by a very bad road. The land under vines is in general very much subdivided throughout France, but here the properties are of less extent than any where I have been. Five or six proprietors often divide among them a piece of ground not exceeding an acre in extent, and the usual extent of most of the separate properties is not more than half an acre. The vigneron said that the wine produced to the left of the by-road we were travelling was inferior to that on the right, which was higher and drier. We turned off into the vineyard of Chambertin, which in extent cannot exceed 15 or 20 acres; but this, like most other parts of the district, is subdivided among a number of proprietors. The vignerons were at work on most of the divisions, which are only made by a footpath, or an irregularity in the

plantation. The soil of Chambertin varies extremely, even in the distance of 100 yards; that nearest the road is of a brown loam of sufficient consistency, but full of gravel, and consequently very friable. The gravel consists of small broken pieces of the whitish limestone, of which the hill is partly formed. At the highest limit to which the ground has been broken up, it is a light colored clayish looking soil, with a subsoil of marl, and abundance of small shells. Both of these soils effervesced strongly with an acid, but the light colored evidently contains a far greater proportion of lime. The soils of Beze, another first rate vineyard of the commune of Gevray, was exactly similar to that of the lower part of Chambertin. A league further on, the middle part of the Clos Vougeot was as nearly as possible the same; but the lowest part of that vineyard is almost a pure clay, of a dark yellow color, without any admixture of calcareous matter whatever. From what I had previously observed at Dijon on the one side, and Beaune on the other, I have no doubt that the same character applies, with trifling variations, to the whole range of the Cote d'Or. Nearest the top the soil contains a larger proportion of lime, and this in general yields the driest and best wine. On descending, the clay begins to predominate, and the wine gradually falls off in quality till it becomes the *vin ordinaire* of the country. By dint of frequent observations and repeated questions, I conceive that I at last perfectly understand the system of *provignage*. To make it plain, suppose a small portion of ground to be annually planted with vines. At the end of ten or a dozen years a number of the plants, in the portion first planted, become weak and worn out. These weak plants are removed, and their places filled by provins from their stronger neighbors; but these provins are not mere layers which leave the stock exactly as before. The whole space of ground, generally the breadth of two rows of plants, is dug out to the depth of about two feet; the old stock is then laid flat down in the bottom of the trench, and the branches, that is, the wood last produced, are twisted and bent into the places where the voids are to be filled. The stock is thus converted into the root of two or three different plants; it throws out fibres from every side, which henceforth yield the nourishment to the plants, and the old root dies off. I observed some spots where all the plants had been too weak, and a colony of young plants, as it was called, had been introduced, which would be employed in peopling their neighborhood when they had acquired sufficient strength. The *provignage* extends irregularly over the whole vineyard, but most, or all, of the plants are thus buried, and renewed once in 12 or 14 years; and thus the whole is in a constant state of bearing, (the provins yielding a crop the first year,) and it is seldom necessary to introduce young vines. All of the small proprietors manure their vines with strong stable dung; they make no distinction between that of horses and that of cows.

After quitting the vineyard of Chambertin. I rejoined the cabriolet, and after recovering the main road, proceeded to Clos Vougeot. This vineyard formerly belonged to a convent, and the buildings are therefore rather extensive. What was the old vineyard is enclosed by a high stone wall; but M. Ouvrard, the present proprietor, has also acquired a considerable portion of the land

without the wall, and the present extent of the Clos Vougeot is therefore 48 hectares, 112½ English acres.

I mentioned to the steward of M. Ouvrard, my disappointment regarding my letters of introduction and my having resolved in consequence to trust to the good nature of the proprietor of Clos Vougeot for a friendly reception. He replied, very heartily, that I had done well. He conducted me over the cellars where the wines are made, and subsequently over those where they are kept, explaining the whole process pursued in making the wine, and answering all my questions with great exactness. The first cellar forms a square, or rather consists of four parallelograms, enclosing a square. In each of the four corners is a large square case, or trough, about 12 feet in diameter; and above this an immense lever, worked by a wooden screw, similar to those I had seen for pressing the olives in Spain. Along the walls, on each side, are arranged the fermenting vats, which are each of the capacity of 18 hogsheads. The vintage is, in general, soon over, M. Ouvrard employing often from 400 to 450 vintagers at the same time. For the red wine, the grapes as they are brought in are thrown into the large cases or troughs above described, and there trodden by a number of men, with large wooden shoes, till the grapes are nearly all broken. They are then taken up in baskets, with interstices wide enough to allow the grapes to pass through, when a portion of the stalks, generally about two thirds, are taken out. If the whole of the stalks were taken out, the quality of the wine, as has been repeatedly proved, would be inferior. The whole is then put into the vat into which the must, as it ran from the treading, had been previously carried. With the number of people employed, it requires a very short period to fill a vat. A space of about 12 inches is left unfilled at the top, and a sliding lid is then put over, which floats upon the surface. As soon as the fermentation becomes violent, the swelling of the mass lifts the lid to the height of six inches above the mouth of the vat. As, however, the skins and the stalks had previously risen to the surface, none of the liquor escapes. A very small space, formed by the looseness of the lid, is considered sufficient to allow the gas to escape, until the rising of the lid allows a greater space. And it is perhaps owing to the confinement of the gas that the lid is raised to such a height. If the weather had been very warm when the grapes were gathered, and still continues warm, while the fermentation is going forward, the wine is soon made. The fermentation is sometimes over in 30 hours; at other times it continues 10, 12, and even 15 days. The best wine is always produced from the most rapid fermentation. When the fermentation slackens, the liquor begins to subside, and when it is entirely over, sinks within the top of the vat, but not so low as when the vat was first filled; for the *marc*, or, in other words, the stalks and skins, are completely separated from the liquor, and float upon the top.

As soon as it is known, by the subsiding of the head, and by the taste and examination of the wine, that the fermentation has ceased, the wine is drawn off into large vats, which contain about 700 gallons each. Every three or four months it is pumped, by means of the syphon and bellows, into another vat of the same dimension, when a

man enters by the small opening left in the end of the vats, and washes out, with a brush and cold water, any lees which may have been deposited. The Burgundy of the Clos Vougeot receives no other preparation, and it is treated in this manner as often as may be judged requisite, till it is disposed of. They commence selling it when three and four years old, but the wine of very favorable seasons is retained by the proprietor till it is ten or a dozen years old, when it is bottled, and sold at the rate of six francs a bottle. The price of the wine of ordinary vintages, from three to four years old, is from 500 to 600 francs the hogshead, but seasons occasionally occur when the wine is not better than the *vin ordinaire* of the country. The wine of 1624 was given to the laborers as their ordinary drink; that of 1825 is now ripening in the large vats, and will be worth, in three or four years more, six francs a bottle. The wine has been found by experience to be of better quality, and to preserve its perfume better, in these large vats than in casks.

For making the white wine, the process here, as elsewhere, is different. The grapes are pressed without being trodden; the *must*, as it flows from the press, is conveyed to the small casks, where it is left to ferment, the casks being occasionally filled up to allow the scum to escape. The fermentation of the white wine lasts from 10 to 15, or even 20 days. At the end of three weeks, or a month, the white wine is drawn off the gross lees which it has deposited, into clean casks. In the spring it is again drawn off into sulphured casks. M. L'Ecrivain, M. Ouvrard's steward, knows the use of spirit of wine, instead of sulphur, but they use the latter from economical motives; the sulphur for a cask costs only a sou, the alcohol to produce the same effect would cost six sous. They do not find that the sulphur tastes the wine. They are getting rid of the white grapes in the Clos Vougeot, for the vines not only produce less, but the price of white wine never rises so high as the red wines. It is no uncommon thing for a hogshead of the latter to bring from 1,250 to 1,500 francs, but the white wine never rises above 600 francs the hogshead. The average produce of the Clos Vougeot, that is to say, the average of twenty years, is about 100 *quives*, of two hogsheads each, or about eight hogsheads per hectare, something less than $3\frac{1}{2}$ hogsheads per English acre. They never manure the vines, and they have no other varieties of the black grape than the *Pineau*, or of the white, than the *White Pineau*, and the *Chaudenay*, which resembles it so much that the two kinds are confounded. M. L'Ecrivain said, that if he knew of a plant of the *gamé* in the vineyard, he would have it immediately dug out. Every year they carry up a quantity of the strong soil from the bottom of the vineyard, which, as before observed, consists of a yellow clay, to mix with the lighter soil of the higher part. They also mix the wine produced on the higher part of the vineyard with what is produced at the bottom, to make a perfect wine. The wine of the higher part is by itself too dry and spirituous, and requires the mixture from the lower part to give it body. The substratum is in some places marl, and in other places decayed (*pourri*) rock. The cultivation is much the same as described for Chambertin. M. D'Ecrivain considers that the vineyard is of the proper degree of fulness when the plants are fifteen

inches apart in every direction. In the course of from 12 to 15 years, all the plants in the vineyard will undergo the process of *provignage*; but the winter before last appears, from all accounts, to have injured the vines exceedingly, and they are every where digging out many of them which have not recovered from the effects of the frost. M. Ouvrard, the proprietor of Clos Vougeot, also possesses a portion of Chambertin, and it is probable that to this circumstance the latter is indebted for being brought into notice; for it appears to me indubitable that it only requires similar treatment to make a very large portion of the Cote d'Or produce wines equal to those of Vougeot and Chambertin. But it requires a large capital to effect this, and a knowledge of commerce to make it profitable; and the smaller proprietors appear in general to endeavor to make up by the quantity, for what they sacrifice in the quality, of their wines. From other accounts I am inclined to believe that the produce of a vineyard planted with the *gamé*, and manured, as stated to me at Dijon, viz. about 1000 gallons per English acre, was not much exaggerated. After having received from M. L'Ecrivain a small bundle of each of the kinds of vines cultivated in the Clos Vougeot, and thanking him for his kindness, I took my leave, and arrived at Dijon at rather a late hour.

Wednesday, 21st December, Rheims.—After having quitted the Cote d'Or, the seat of the famous vineyards of Burgundy, there appeared little to be worthy of my attention till I should reach Champagne; and I therefore made the best of my way for this town, the centre of the district, in as far as at least as the chief trade in Champagne wines is concentrated there. For the last two days I had travelled through a bare, uninteresting country, consisting almost exclusively of a chalk subsoil, with a thin layer of vegetable mould on the surface. After quitting Dijon, few vines were to be seen till after having passed Chalons-sur-Marne, between which and Rheims are situated the *Sillery* vineyards, which produce the famous *still* wines of that name. The range of hills lies to the left of the road, and has an eastern exposure, in some places even to the north of east. The small town of Sillery is three or four miles from the nearest of them. During part of the journey from Dijon to Rheims, I travelled in company with an officer of artillery, who had gone to Algiers with the expedition, and had only returned to France about a month before. The French colony there remains almost stationary; owing to the insecurity of the settlers, there is little or no emigration. There are now 1,500 French troops in the country, and it would require not fewer than 40,000 to protect the settlers within 25 miles of Algiers. Allotments of land are only made to actual laborers, and not to a greater extent than from 8 to 20 acres each, and there is generally also a house and garden. The land granted by the French government was the property of those who abandoned their homes on the French taking possession; those who remained were undisturbed in their property. There are also extensive domains which belonged to the dey or the government. Merino sheep are plentiful, and in large flocks; the mutton is excellent. Beef is not so good. The French have made excellent wine from very delicious grapes. The civil courts of justice are still preserved as before and the same officers employed.

The same taxes are also raised, but they are of trifling amount. Most of the emigrants, including Swiss, Germans, Italians, and a few Spaniards, have become dealers, leaving to the Bedouins the cultivation of their land. The hostile Bedouins come down upon the outposts in bands of 15,000 or 20,000, but they cannot withstand the attacks of a small body of disciplined troops.

The very eminent wine house of Messrs. Ruinart and Son, of Rheims, are agents for Herries, Farquhar and Co.'s notes. Having called upon them to cash one of these, M. Ruinart, junior, conducted me over their wine cellars, which are very extensive, and all subterranean, consisting of three under-ground stores, one beneath another, all mined out of the limestone rock. The wine which has received the last attentions which it requires, and is ready for expediting to the consumer, is packed in large square masses, bottle above bottle, and side by side, with no other precaution to keep them steady than a lath passing along between the necks of one layer and the butts of the next layer above. They generally send the wine to the consumer at the age of three and four years, but after the first winter, it is all put in bottle. The stock, therefore, appears immense, and, indeed, it is very large, for not only are different qualities required but also different descriptions, to suit the varying tastes of their customers in England, America, and Russia, to which countries Messrs. Ruinart make their chief exports. A gentleman, with whom I travelled, told me he could buy very good sound Champagne at Chalons for two francs a bottle, and was then going to purchase 100 bottles at that price; but respectable wine merchants never send any to England under three francs a bottle. What is sent to England is more spirituous, and froths more strongly than what is sold for domestic consumption. The greatest and most minute attentions are necessary in preparing Champagne. The casks in which it ferments, after running from the press, are previously sulphured, to prevent the fermentation from proceeding to too great a length. It is twice clarified, during the winter, and in the month of March, before the return of spring has renewed the fermentation, it is bottled off. When in this state the bottles are placed in frames, diagonally, with their heads downwards. The lees are thus collected in the neck of the bottle; but they do not consider it necessary to uncork the bottles as soon as the wine is perfectly clear, nor is it considered that there is any danger of the wine spoiling if the return of warm weather should cause a commencement of the fermentation, and remix the lees through the wine. On the contrary, they sometimes allow the lees to remain to ripen, as they term it, longer than usual. The wine, in general, remains in this state till the following winter; each bottle is then placed in a frame, and carefully uncorked. The contents of the neck of the bottle are emptied. It is filled up from another bottle of the same wine, and being recorked, only now requires age to give it all the perfection it is capable of. It of course often happens, that the wine has either undergone less than the usual fermentation, or, being stronger than usual, requires a greater fermentation before being put into bottles; and it consequently happens that the fermentation in the bottles is greater than they can bear, and that a large proportion of them burst during the

first summer. The floors of the wine cellars are all covered with grooves sloping to a gutter, by which the wine which has burst the bottles is conveyed to a cistern in the floor; and as there is most perfect cleanliness observed, a part of the wine is thus sometimes saved.

Mr. Ruinart, Junior, is a large proprietor of vines at Ay, where the first qualities of frothing Champagne are made, and to this place he strongly recommended my proceeding, in order to have the most favourable view of the vineyards of Champagne, of which, he said, the cultivation was every where nearly similar, although conducted at different places with more or less care. He says the ordinary produce of his own vineyards is from 10 to 12 pieces, of about 46 gallons per arpent, which is about a 25th part more than an English acre; that is, from 440 to 530 gallons per English acre. Having determined on visiting Ay, M. Ruinart gave me a letter to his manager, but he said he expected him next day at Rheims, and would give him full instructions on seeing him.

Thursday, 22d December.—At six o'clock this morning I joined the voiture for Epernay, where I arrived at eleven o'clock. After breakfast I immediately proceeded to Ay, intending to return the next day also to meet the agent of M. Ruinart, should I not be satisfied with the information I might procure in his absence. Ay is a small town on the right bank of the river Marne, a little higher up than Epernay which is situated on the left bank. On both sides of the river there is a range of chalky hills, but separated also by a very beautiful meadow about a mile in width. These hills are of no great elevation, and are more or less steep, but in no place is the soil required to be supported by terraces. The range of hills above the town of Ay is exposed to the full south, except where the exposure is varied by recesses in the range; it consequently produces wine of the finest quality, and very superior to that of Epernay, which is produced on hills exposed to the north. I walked through the meadow with great difficulty and labor, the road being almost impassable in some places, owing to the depth of the mud. On arriving at Ay, I delivered my letter to Madame Hazart, the wife of M. Ruinart's manager, and expressed my doubts whether I should return the next day. She immediately called the *maitre vigneron* to proceed with me to the vineyard, and another to obtain the plants which the letter expressed my wish to procure. The depth of soil, before reaching the chalk on the hill of Ay, is, in most places, according to the report of the vigneron, 10 to 15 feet; nor is he aware of any difference being occasioned in the quality of the wine when the chalk comes nearer the surface, which happens a little farther to the east, where they also make wines of the first quality. The soil is strongly calcareous, full of small pieces of chalk, and of stones. Near the top of the hill the soil is more argillaceous and stronger than towards the bottom; and this, in some degree, affects the quality of the wine, but not in a great degree. The great difference is caused by difference in exposure, that to the south producing uniformly the best; where the soil is the same from the top to the bottom, the middle region of the hill is still the most valuable, for it is less subject to the injuries which early frosts frequently occasion in the lower region, and enjoys in general a warmer sun, especially towards

the close of the season, than the top. When the season has been extremely fine and warm from beginning to end, the wine of the higher and lower regions of the hill equals that of the middle region. If I was struck with the closeness of the plants in Burgundy, the closeness of these was more remarkable still. The vigneron said, that if it were possible to keep the vineyard fully furnished with plants, there would be one for each 8 or 9 inches in length, by 6 or 7 in breadth. The supposition which I made to illustrate the mode of *proviognage* in Burgundy is actually realized here. Every year an addition is made to the bottom of the vineyard of a certain number of plants, and the whole of the vines are in a state of continual progression, being buried, and by that means carried 12 or 14 inches up the hill every third year. The process is of course not regular, for in every place there are plants in each stage of the progress which they pass through. According to the number of the voids to be filled, the branches of the stock that is buried are from two to four or five. On each of these branches, when pruned in the spring, are left two buds; these buds produce branches or shoots, which bear fruit the first year. The next spring three buds are left upon the higher, and two upon the lower of the two shoots, and the spring following they are pruned to bear shoots corresponding to the number of voids to be filled in their neighborhood, for their turn to be buried has again arrived. By this means, also, a supply of rooted plants is obtained when they are required; but when these rooted plants are cut off, and planted out, they never bear fruit till the third year. The *maitre vigneron* said, he believed the roots never die. They frequently trace them to a very great length, but never disturb them, always burying the others above them. The produce per arpent, he says, sometimes amounts to 15 pieces, (660 gallons per acre,) and the small proprietors, who manure their vines more strongly, have frequently 16. M. Ruinart himself told me, that he knew instances of four arpents giving 100 pieces, 1,100 gallons per acre. The manure is always added to the plants which have been buried; a handful of earth is first put over the plant, and the manure above. They are, however, extremely cautious as to the quality of the manure. In some places I observed dung from the farm yard mixed with the soil, but in general it was only strong soil from the valley below, mixed with ashes, and other amendments of a mild description.

I here closed my examination of the vineyards of France, there being no point unexplained of sufficient importance to induce me to wait another day for the purpose of seeing M. Ruinart's steward. Next morning the *maitre vigneron* brought me three small bundles of plants, which, he said, were the only varieties cultivated in the vineyards which produce good wine. The black and white *Pineau*, according to M. Ruinart's statement, and as is generally understood, are the varieties of vines cultivated in Champagne, as well as in Burgundy. The vigneron brought me two black varieties, which he called the *plant vert*, and *plant dore*, and one white. The *plant dore*, he said, was introduced into the vineyards of M. Ruinart only a few years ago, and was not common in the country. It is much more productive than the other two varieties. These plants were all rooted, having been cut from stocks that had been buried the

preceding season: they had each two branches, and are sold in the country at the rate of a half-penny each. These plants were very abundant this season, for a vast number had been destroyed by the severity of the winter, 1829-30, and it was necessary to provide plants to replace them. To such an extent were the vineyards injured during that season, that in some places the quantity of wine produced did not exceed from 2 to 3 pieces per arpent. With such difficulties to overcome, the vineyards of Champagne and Burgundy are striking examples of the effects of industry and skill. Nothing can contrast more strongly than the small and puny shoots of the vines of Champagne and Burgundy, compared with the strong and vigorous branches of the vines of Spain; yet have the care and skill of the cultivators produced in the former countries, a wine equal in value to the best of those produced in the most favored climates, and, notwithstanding all their losses, much more abundant in quantity.

Having recorded with so much minuteness my observations on every vineyard and district through which I passed, I will avoid adding to the length of this journal by offering many general remarks. I cannot, however, refrain from observing, that from the albarizas of Xeres, the most southern vineyards of any reputation in Europe, to those of the chalky hills of Champagne, amongst the most northern, I met with no vineyard producing dry wines of reputation, which was not more or less calcareous. Although it is acknowledged that two thirds of the vineyards of France are situated upon soil more or less calcareous, by Chaptal, and other writers upon the subject, they have stated, that provided the soil is porous, free, and light, its component parts are of little consequence; and they enumerate granitic, schistose, argillaceous, flinty, sandy, and calcareous soils, as equally well qualified to produce, and as actually producing, in different parts of France, wines of the finest quality. It appears evident to me, however, that these writers have, in many instances, been misled by the representations which have been transmitted to them; as, for instance, when Chaptal and Cavoleau* cite the wine of Hermitage as an instance of the excellence of wines produced upon the *debris* of granite; while the fact is, that the wine of the hill of Hermitage owes its superiority over the wines of the other hills in its neighborhood only to the circumstance of the granitic soil of a part of that hill being mixed with calcareous matter; and but for this circumstance, I am satisfied that the wine of Hermitage would never have been heard of beyond the neighborhood where it grows. I am therefore of opinion, that the finest dry wines owe their superiority chiefly to the quality of the soil; and I am much mistaken if it be not found that the soils of all vineyards producing dry wines of superior excellence are strongly calcareous. All my observations have led me to this conclusion, and I know of no instance to the contrary. It will be observed, that I here only speak of dry wines, for sweet wines of great excellence are produced in a variety of soils, and, in fact, owe their qualities more to the variety of the grape, and the manner in which it is treated, than to the soil. The sweet *Muscat* and *Old Mountain*

* *Cenologie Française, ou Statistique de Tous les Vignobles de France. Paris, 1827.*

wines of Malaga are celebrated all over the world; but though they have the same varieties of vines at Malaga as at Xeres de la Frontera, and pursue a similar practice in making the wine, the heat of their dry wines, produced on a soil consisting of decomposed slaty schist are insipid and flavorless when compared with the Sherries which are produced on the chalky hills of Xeres. The sweet wine of Rivesaltes, the most celebrated in France, is produced on a granitic soil covered with pebbles; and the sweet wines of Cosperon and Collioure, in the same department, are produced on hills of schist, as nearly as possible resembling those of Malaga. But though the dry wines of both these soils are well known, they are not distinguished for their fineness or flavor. Their excellencies are their strength and rich color, which make them valuable for mixing with the weak and light colored wines of the ordinary growths of Burgundy and Macon, which supply the chief consumption of Paris.

The limited extent of the first-rate vineyards is proverbial; and writers upon the subject have almost universally concluded that it is in vain to attempt accounting for the amazing differences which are frequently observed in the produce of vineyards similar in soil, and in every other respect, and separated from each other only by a fence or a footpath. My own observations have led me to believe, that there is more of quackery than of truth in this. In all those districts which produce wines of high reputation, some few individuals have seen the advantage of selecting a particular variety of grape, and of managing its culture so as to bring it to the highest state of perfection of which it is capable. The same care has been extended to the making, and subsequent management of their wine, by seizing the most favorable moment for the vintage, by the rapidity with which the grapes are gathered and pressed, so that the whole contents of each vat may be exactly in the same state, and a simultaneous and equal fermentation be secured throughout; by exercising equal discrimination and care in the time and manner of drawing off the wine, and in its subsequent treatment in the vats or casks where it is kept; and lastly, by not selling the wine till it should have acquired all the perfection which it could acquire from age; and by selling, as the produce of their own vineyards, only such vintages as were calculated to acquire or maintain its celebrity. By these means have the vineyards of a few individuals acquired a reputation which has enabled the proprietors to command almost their own prices for their wines; and it was evidently the interest of such persons that the excellence of their wines should be imputed to the peculiarity in the soil, rather than to a system of management which others might imitate. It is evident, however, that for all this a command of capital is required, which is not often found among proprietors of vineyards; and to this cause, more than to any other, it is undoubtedly to be traced that a few celebrated proprietors have acquired, and maintained, almost a monopoly in the production of fine wines.

On my arrival at Paris, I waited upon the director of the Royal Nursery of the Luxemburg, and inquired whether I could get the deficiencies supplied in my list of vines procured at Montpellier. He replied, certainly; there would be no difficulty

in the matter, for any plant could be procured from the nursery at a regulated price. That for vine cuttings was two francs and a half per hundred. I therefore delivered him my list, with the deficiencies marked, to the number of 133, and of these 110 were supplied, two plants each. I here also procured six cuttings each, of sixteen of the most valued varieties of vines which are cultivated in those provinces which I did not myself visit; and after very considerable difficulty, I obtained a copy of the printed catalogue of the Royal Nursery of the Luxemburg, including a list of the collection of vines.

From Stewart's Stable Economy.

ARTICLES USED AS FOOD FOR HORSES.

Kinds of food.—In this country horses are fed upon oats, hay, grass, and roots. Many people talk as if they could be fed on nothing else. But in other parts of the world, where the productions of the soil are different, the food of the horse is different. "In some sterile countries they are forced to subsist on dried fish, and even on vegetable mould; in Arabia, on milk, flesh balls, eggs, broth, &c. In India, horses are variously fed. The native grasses are judged very nutritious. Few, perhaps no oats are grown; barley is rare, and not commonly given to horses. In Bengal, a vetch, something like the tare, is used. On the western side of India, a sort of pigeon-pea, called gram (*cicer arietinum*) forms the ordinary food, with grass while in season, and hay all the year round. Indian corn or rice is seldom given. In the West Indies, maize, Guinea corn, sugar-cane tops, and sometimes molasses are given. In the Mahratta country, salt, pepper and other spices are made into balls with flower and butter, and these are supposed to produce animation, and to fine the coat. Broth, made from sheep's head, is sometimes given. In France, Spain, and Italy, besides the grasses, the leaves of limes, vines, the tops of acacia, and the seeds of the crab-tree, are given to horses."

The articles upon which horses are fed in this country are usually arranged into three classes. That which possesses the least nutriment, in proportion to its bulk, is termed *fodder*, and consists of grass, hay and straw; that which possesses the most nutriment in proportion to its bulk, is termed *corn*. This word is often used as if it belonged exclusively to oats; but it is a general name for all the kinds of grain and pulse upon which horses are fed. In this work it is used only in its general sense. *Roots*, such as carrots, turnips and potatoes form the third kind of food. In relation to their bulk they have less nutriment than corn, and more than fodder. I do not think this classification is of any use, and here it will not be regarded, but it is well to know the meaning usually attached to the terms.

Green herbage.—There are several kinds of green meat, but the individual properties of each are so little known, that much cannot be said about them.

Grass is the natural food of horses. It is provided for him without the interference of art. It is

* Loudon's Enc. of Agric., p. 1004.

composed of a great number of plants, differing much or little from each other in structure, composition, and duration. Some of the natural grasses are to the horse mere weeds, destitute of nutriment, though not positively injurious. Several are rejected, or eaten only when there is nothing else to eat, and none are sufficiently rich to maintain the horse in condition for constant work, even though the work be moderate. At a gentle pace, he may travel a few miles to-day, but he is unfit for a journey to-morrow. By cutting the grass and bringing it to the stable, the horse may be saved the labor of collecting it; but still he can render very little service.

Grass, however, or green herbage of some kind, is given to almost all horses during a part of the year. The young animals, from the time they are weaned till they are fit for work, receive grass as long as it can be had. Hunting and racing colts excepted, they receive little else.

It is commonly believed that grass has some renovating and purifying properties not possessed by hay nor by corn. It is true that all the kinds of green herbage, including clover, saintfoin, lucerne, tares and ryegrass, produce a change upon the horse. But whether the change be for better or for worse, is another question. For the first two or three days, green meat relaxes the bowels and increases the secretion of urine and of perspiration. Very often it produces an eruption on the skin, particularly when given along with a large allowance of corn. When the horse is permitted to eat what he pleases, the belly becomes large. These effects may be termed immediate. They are most apparent at the commencement, but are visible so long as the horse receives any considerable quantity of grass. Green meat produces other effects not so easily traced. Wounds heal more kindly, inflammatory diseases are not so fatal, and chronic diseases frequently abate, or they entirely disappear under the use of grass. The horse, however, is always soft, when fed much on green meat. He sweats a great deal, and is soon exhausted by his work.

Clover, ryegrass, tares, lucerne, saintfoin, and the oat-plant are all used as green meat. So far as the horse is concerned, one seems to be as good as any of the others. They appear to produce the same effect as grass. Amid such variety we might expect to find some difference, but I have not been able to perceive any. Some horses, indeed, like one article better than another, but this seems to be mere taste, for no one of them appears to be generally preferred nor rejected. There are various opinions, however, as to the comparative value of these articles. Some affirm that clover is less nutritious than ryegrass, some that tares are poor watery feeding, and others that lucerne and saintfoin are the best of the whole lot. But opinion on the subject seems to be quite vague. Whatever one affirms another will be found to deny. In Scotland, lucerne and saintfoin are very little used; but clover, rye-grass and tares, are given each in their season, as if one were equal to another.

Beans, wheat, rye and oats, the whole plant, are sometimes, but very seldom, and never regularly, used as food for horses. Cabbage, and some other green articles, are eaten, but they deserve no particular notice. Several, which form the ordinary green meat of horses in other countries, are not grown here. The leaves and clippings of the vine are much used in many parts of France.

Whin, Furze, or Gorse. This is an abundant and cheap plant. It is very good green meat for horses, and is procured when there is no other. To sick horses it is an excellent substitute for grass, and many will eat it when they will eat nothing else; but it has been extensively tried as an article of ordinary feeding. It has long been used in many parts of Wales and Scotland, and in several of the Irish counties. Mr. Tytler of Balmain was the first, I understand, to publish a useful account of its properties. His essay will be found in the fifth volume of the Highland Society's Transactions. "It appears that, for five successive years, Mr. Tytler fed his farm horses from the beginning of November to the middle of March, on furze and straw, with a very moderate allowance of oats during only a part of that time. At first oats were given throughout the winter, but afterwards only from the beginning of February, and then only at the rate of three pounds two oz., or about one third of a peck, of average quality to each; the daily allowance of furze during the first period being twenty-eight pounds, and during the second eighteen pounds, with fourteen of straw."

"The whins were cut by a woman. Provided with a pair of stout hedge gloves, a sheep-skin apron, a reaping hook, and a forked stick, she drew the plants to her with the fork, and cut off the succulent shoots of the year's growth. These being laid in bundles compressed by a stroke of the foot, were ready for carting. Sufficient for a dozen horses at their fullest feed, could be cut in six or seven hours. A mule and boy carted the load to the farm yard, where the mule was yoked to a bruising mill. This consisted of an old millstone, mounted upon a horizontal axle twelve feet long, attached by one end to a post, round which the stone revolved on a paved circular bed, eight feet in diameter. To the other extremity a swing-tree was hung for yoking the mule. The whins were spread in the course, and turned over until sufficiently crushed. This process occupied about three hours."

"The daily expense of feeding eight horses was thus calculated by Mr. Tytler:

	Nov. to Feb.	Feb. to Mar.
	s. d.	s. d.
Woman's wages,	0 6	0 4
Part wages of boy,	0 4	0 3
Part keep of mule,	0 4	0 3
1 cwt. of straw,	2 0	2 0
25 lbs. of oats,	0 0	2 6
	3 2	5 4"

By this it appears that the keep of each horse per day amounted to only fourpence three farthings in the first period, and eightpence in the second. The work was the same as that of other Berwickshire teams, which is by no means light; and Mr. Tytler says, the horses not only kept, but improved their condition during the whole season; but they began to show a distaste to the whins about the commencement of spring.

Furze is generally used on the frontiers of France and Spain; and the British cavalry while in the Pyrenees, under the Duke of Wellington, had no other forage.

According to the Mid-Lothian Report (Appendix, No. vi, p. 56) it has been found that an acre of whins is sufficient for six horses, during four months; that they require two years to produce

them; that horses, with whins, and one feed of corn, were in as good order as with two feeds and straw;* that all the straw and one feed of oats were thus saved; that, valuing these at sevenpence a day each horse, the saving in seventeen weeks amounted, on the six horses, to £17 17s.—from which, deducting five shillings a week, as the expense of cutting and bruising, there would remain £13 12s. as the product of two acres.†

Dry herbage.—In this country the dry herbage consists of hay and straw. In France, the vine leaves are collected and stored for winter fodder. In the West Indies, the tops of the sugar cane are deemed highly nutritious, after they are dried and sweated a little in heaps. In a season of abundance, ricks of the cane tops, the but-ends in, are made in the corner of each field, to supply the want of pasturage and other food. These are chopped small, and mixed with common salt, or sprinkled with a solution of molasses. Maize is sometimes made into hay. "When Guinea or Indian corn is planted in May, and cut in July, in order to bear seed that year, that cutting properly telled, makes an excellent hay, which cattle prefer to meadow hay. In like manner, after the corn has done bearing seed, the after crop furnishes abundance of that kind of fodder, which keeps well in ricks for two or three years.‡ "In some places, dried ferns, reeds, flags, small branches or twigs are dried and used as substitutes for hay."§ Doubtless there are many other plants made into fodder in different parts of the world. Where Canary corn is raised, the chaff and straw are given to horses, from which it is said they derive more nutriment than from hay.

Hay.—In Scotland most of the hay used for horses is composed of ryegrass, or ryegrass and clover. The natural hay, which is not very much used here, contains several plants. Much of the hay in Scotland is bad. A good deal is grown on poor land, and this is soft, dwarfish, and destitute of nutriment. But hay in general is not well made. In the south it is cured with more skill, and preserved with more care. The best we have in the west of Scotland is procured from Stirlingshire, and is composed of ryegrass and a little clover.

In England clover-hay stands in high repute for hard-working draught horses. In the market it brings 20 per cent. more than meadow or ryegrass hay. Hard upland meadow is preferred for hunters and racers, because I suppose they are apt to eat too much of the clover. In Scotland, ryegrass, or a mixture of ryegrass and clover, is considered the best for all horses. Here we have almost no good meadow hay, and most of that made from the natural grasses is hardly worth preserving.

Good hay is about a year old, long and large, hard, tough; its color inclining to green, rather than to white; it has a sweet taste and pleasant smell; the seed is abundant; infused in hot water, it produces a rich dark-colored tea. The less dust

it has about it the better; but, from the soil, and the way in which hay is made here, it is seldom free from dust. In damp weather hay absorbs much moisture, and weighs a good deal the heavier. In England, the market weight of new hay is sixty pounds per truss till the 4th of September. The truss of old hay contains only fifty-six pounds.

New hay is purgative and debilitating. It seems to be difficult of digestion. The horse is fond of it, and will eat a large quantity, much of which passes through him little altered by the digestive process, and probably retaining a good deal of its nutriment. On the other hand, hay which is very old, is dry, tasteless, brittle. The horse rejects much, and eats little. Old hay is much recommended; but by old, I suppose is meant not new. In the south, perhaps stacked hay does not so soon degenerate as in the north, where it is certainly old enough in one year.

Heated hay, sometimes termed mowburnt, is that which has undergone too much fermentation. In curing hay it is thrown in a heap to sweat, that is, till a slight degree of fermentation takes place, which is arrested by exposing the hay to the air. This, it appears, is necessary for its preservation in the stack. But sometimes the process is carried too far, or, more frequently, it is re-excited, after the hay is stored past. Hay that has been thus injured is not all alike. Some of it acquires a very sweet sugary taste; and this portion is eaten; some is changed in color to a dark-brown, and has its texture altered; it is short, brittle as rotten wood, and has a disagreeable taste; this portion seems to be rejected; another portion of the same stack is mouldy, stinking, quite rotten, and no horse will eat this. All kinds of hay, however good originally, may suffer this injury. When the damage has been slight, most horses will eat certain portions of the hay very greedily; they seem to be fond of it for the first week, but subsequently it is rejected in disgust. Upon the whole, I believe it is the most unprofitable fodder that horses can receive. When very bad, it is dear, though obtained in a gift, for it often does much mischief, particularly to horses of fast-work. Much is wasted, and that which is eaten does little good. It is almost as poisonous as it is nutritious. Slow draught-horses may not, indeed, be greatly injured by it. But good wheat-straw may be better. To fast, hard-working horses, such as those employed in mails, it is a strong diuretic; and its diuretic power does not diminish by use. Hay forms an important part of the horse's food, particularly of those horses that receive no roots nor boiled meat. Bad hay will change the horse's appearance and condition in two days, even when he has an unlimited quantity of corn. By bad hay, I mean that which is unwholesome. It may be poor, having little nutriment, but sweet and digestible, without being pernicious. But good straw is better than unwholesome hay for all kinds of horses. The kidneys are excited to extraordinary activity. The urine, which, in this disease, is always perfectly transparent, is discharged very frequently and in copious profusion. The horse soon becomes hidebound, emaciated, and feeble. His thirst is excessive. He never refuses water, and he drinks as if he would never give over. The disease does not produce death, but it renders the horse useless, and ruins the constitution. Should he catch cold, or take the influenza which prevail-

* The "order," I suspect, would be nothing to boast of.

† British Husbandry, Vol. i. p. 135. See also the Annals of Agriculture, Vol. xxv. p. 13. Ency. Brit. art. Agriculture. Farmer's Mag. Vol. xx. p. 282. Comp. Gazier, fifth ed. p. 559; and Quar. Journal of Agric. No. xi.

‡ Bracy Clarke's Pharmacopœia Equina.

§ Blaine's Outlines of Vet. Med.

ed so much in Glasgow during the winter of 1836, glanders is seldom far off.* This worthless hay is always sold at a low rate, and much of it enters the coaching stables. But I am perfectly sure that it would be cheaper to pay the highest price for the best. One ton of good hay will, unless the men be excessively careless, go as far as two tons of that which is bad. To slow-work horses, mow-burnt hay may be given with less detriment, but it is least unprofitable when consumed by cattle.

Musty hay is known by its bad color, its unpleasant smell, and bitter taste. It is soft and coated with fungi. Like all hay, its smell is most distinct when slightly dampened by breathing upon it. Old hay is often musty, without having been heated. None but a hungry horse will eat it, and when eaten in considerable quantity it is said to be "bad for the wind." In truth, it is bad for every part of the body. In some places they sprinkle this musty hay with a solution of salt, which induces the horse to eat it, but even thus, it answers better for bedding than for feeding, and to that purpose the horse applies most of it.

Weather-beaten hay is that which has lain in the sward exposed to the rain and the sun. It is musty, full of dust, sapless, bleached, or blackened, and destitute of seed. Such, also, is the state of that which has stood too long uncut. All hay should be cut a few days before the seed is quite ripe. After it has lost most of its seed, and its juices, little is left to afford nutriment.

Salted hay, that is, hay with which salt has been mingled at the time of stacking it, is not much used in Scotland. It is not to be had. I can tell nothing about it. Horses are said to prefer it to any other. But the principal motive for salting hay is to preserve it when the weather requires that it be stacked before it is sufficiently dry. Salt prevents or checks fermentation. It darkens the color of the hay and makes it weigh heavier, for salt attracts moisture. Salt, I think, should not be forced on the horse. It may excite too much thirst. Given apart from the food, he may take all that is good for him. Damaged hay is often sprinkled with salt water, which seems to render it less disgusting, and may possibly correct its bad properties. It should be wetted as wanted, for it soon becomes sodden and rotten.

The daily quantity of hay allowed to each horse must vary with its quality and the work. If the corn be limited, the horse will eat a greater weight of poor hay than of that which is more nutritious. If it be damaged, he must consume more than if it were sound, for he rejects some, perhaps a half, and that which he eats does not furnish so much nutriment. When the work is fast, the horse must not have so much as to give him a large belly. Eight pounds of good hay is about the usual allowance to fast-working horses, that may receive from twelve to fifteen or eighteen pounds of corn. Large draught-horses will consume from twenty to thirty pounds, but the quantity is seldom limited for these. Much, however, depends upon the allowance of corn. A German agriculturist calculates that eight pounds of meadow-

hay, or seven of that made from clover, tares, or saintfoin, afford as much nourishment as three pounds of oats. Of the hay raised on poor soils, nine pounds may be required.

A horse can live on hay and water, when thrown off work, for a considerable period, he often receives nothing else. This is not always right. The horse becomes so feeble and so pot-bellied that it is long ere better food will restore his condition for work. A little corn, some roots, or a bran-mash, though given only once in two days, will help to keep him in flesh. I have heard of the horse being kept almost entirely on hay, receiving corn only when he was to be used. I would recommend the owner to confine himself to bread and water for a week or two, and then try what a beef-steak will enable him to do. There is a material difference between eating to live, and eating to work. The stomach and bowels will hardly hold sufficient hay to keep even an idle horse alive.

The only preparation which hay receives before it is given, is that of cutting it into chaff, into short pieces. When given uncut, the groom does, or should shake out the dust before he puts it in the rack.

Hay tea.—An infusion of hay made by pouring boiling water upon it, and covering up till cool, has been recommended as an excellent nutritious drink for sick horses, and also for those in health. It might perhaps be a very good substitute for gruel; perhaps a quart or two of the tea might not be a bad thing for a racer, given between heats, and towards the end of the day, when the horse is beginning to get exhausted from fasting, but it has not been tried.

Hay-seed.—In Scotland, and wherever the hay is made chiefly from rye-grass, the seed is often made use of in feeding. It is sometimes mixed with the oats to prevent the horse from swallowing them whole, but most generally it is given along with the boiled meat, either to divide it or to soak up the liquor. It contains more nutriment than the hay itself, but probably not a great deal, unless the hay has stood too long uncut. Some people say that hay-seed is bad for the wind, but I have never been able to trace any evil to its use. There is always much dust mingled with it, and this should always be removed by washing. Sometimes the meat is boiled, and sometimes merely added to the boiled meat while it is hot. I do not know that boiling improves it, but it is much better liked after boiling or masking than in its raw state.

Straw.—There are five kinds of straw used as fodder. I have not been able to learn that rye-straw is ever used as fodder in this country. Of the white kinds, wheat is supposed to be most nutritious. Some, however, like oat-straw as well. Barley-straw is almost useless for fodder, and is not used when any other can be obtained. Pea-straw is better than that of beans; it has been recommended as equal to hay, and I have not much doubt but it is much better than some hay. Straw, however, is little used here. In many parts of Europe, wheat, barley, or rye-straw forms the whole or greater part of the dried herbage, hay being almost unknown. In some of the towns wheat and oat-straw are occasionally given to cart-horses, and in some cases to coaching-horses. In the country, both white and black straw are in common use as winter fodder for the farm-horses.

* The influenza I mean, was not at all similar to a disease which went under the same name at the same time in England. We had almost none of the English influenza till the last week of May, 1837. In the month of June it was very prevalent.

It is very probable that wheat-straw, and perhaps some of the others, may soon be used much more extensively than at present. Good straw is certainly better than bad hay, and possibly, by increasing the allowance of corn, and cutting the straw, hay might be almost entirely dispensed with. Though containing much less nutriment, it still contains some, and it serves quite as well as hay to divide the corn and give it a wholesome size. It must be understood that food ought to possess bulk proportioned in some degree to the capacity of the digestive organs. Nutriment can be given in a very concentrated state, yet it is not proper to condense it beyond a certain point. Corn alone will give all the nourishment which any horse can need, but he must also have some fodder to give bulk to the corn, though it need not of necessity yield much nutriment. Straw, therefore, may often be used where hay is used. This has been proved very fairly in this country. Mr. Mein, of Glasgow, kept his coaching-horses in excellent order for nearly eight months, without a single stalk of hay. During dear hay seasons it is the custom, with many large owners, to make straw from a part of the fodder. Wheat-straw is preferred, but few object to that of the oat.

But when horses are living chiefly on hay, as many farm horses do, during a part of the winter, it must not be supposed that an equal quantity, or indeed any quantity of straw, will supply the place of that hay. The stomach and bowels will hardly hold hay enough to nourish even an idle horse, and as straw yields less nutriment in proportion to its bulk, enough cannot be eaten to furnish the nutriment required. The deficiency must be made up by roots or corn.

When much straw is used, part or the whole ought to be cut into chaff. It is laborious work to masticate it all, and in time it will tell upon the teeth, which in old horses are often worn to the gums, even by hay and corn.

Bean straw is tough and woody, and horses soon get tired of it. But I am persuaded that it might be advantageously made into tea. Bean-straw tea is much esteemed as a drink for milch cows, and if not found equally good for horses, no harm can be done by trying it. Pea-straw also makes very good tea, but the straw itself can be entirely consumed as fodder. The white straw seems to make a very weak infusion. All the kinds of straw soon grow sapless and brittle. They should be fresh.

Barn chaff.—The shell which is separated from wheat and oats in thrashing is often given to farm-horses. It seems to be very poor stuff. It looks as if it contained no nutriment, yet it may serve to divide the corn, to make the horse masticate it, and to prevent him from swallowing it too hurriedly. In this way it may so far supply the place of cut fodder. But the barn chaff is usually mingled with the boiled meat, and if the articles be very soft, the chaff may give them consistence, but it does little more. The coving chaff of beans is said to form very good manger meat.

Roots.—Potatoes, carrots, and turnips are the roots chiefly used for feeding horses. Parsnips, mangel-wurtzel, and yams are occasionally employed.

Potatoes are given both raw and boiled; in either state they are much relished by all horses as a change from other food. They are rather

laxative than otherwise, and especially when given uncooked. Given raw and in considerable quantity to a horse, not accustomed to them, they are almost sure to produce indigestion, when boiled or steamed they are less apt to ferment in the stomach. For horses that do slow, and perhaps not very hard, or long-continued work, potatoes may, in a great measure, or entirely, supersede corn. They are little used for fast-work horses, yet they may be given, and sometimes they are given without any harm. On many farms they form, along with straw fodder, the whole of the horse's winter food.*

According to Professor Low, fifteen pounds of raw potatoes yield as much nutriment as four and a half pounds of oats. Von Thaer says, that three bushels are equal to 112 lbs. of hay. Curwen, who tried potatoes very extensively in feeding horses, says that an acre goes as far as four acres of hay. He steamed them all, and allowed each horse daily, a stone and a half, with a tenth of cut straw which he preferred to hay for this mode of feeding.

The potatoes should be of a good kind, and not frosted. They should always be cooked either by steaming or boiling. They are best when steamed. Horses like them as well raw, but they are excessively flatulent, and this bad property is much corrected by cooking, and by adding some salt. When boiled, the process should be performed with as little water as possible. When nearly ready, the water should be altogether withdrawn, and the potatoes allowed to dry, uncovered, on the fire for a few minutes. They should be put on with cold water. They are always over-boiled. Horses prefer them when hard at the heart. There is a general prejudice against the liquor in which potatoes are boiled. It is said to be injurious. In small quantities it certainly produces no apparent evil. I often see it given, not as a drink, but along with potatoes, beans, and chaff, which are all boiled together and mixed into a uniform mass, in general too soft. In some places the potatoes are not washed when boiled. If the earth does not relax the bowels, I am not aware that it does any injury, and the horses do not appear to dislike it. When the mass, however, from the addition of chaff, requires much mastication, this sand or earth must wear down the teeth very fast.

Turnips are in very general use for farm and cart-horses. Of late they have also been used a great deal in the coaching-stables; in many they have superseded the carrot. The Swedish variety is preferred. Common white turnips are almost worthless. According to Von Thaer, 100 pounds are equal in nutriment to 22 of hay. For slow horses, turnips to a certain extent supersede corn, but for fast-workers, they save the hay more than the corn. They have a fine odor when boiled, and this seems to make the horse feed more heartily. They fatten the horse very rapidly, and produce a smooth glossy coat and loose skin.

They are sometimes washed, sliced, and given raw, but in general they are boiled, and occasionally steamed. In the raw state they excite indi-

* But in Essex, farm-horses have been kept throughout the winter entirely upon steamed potatoes. Each horse got fifty pounds per day, and did the ordinary work of the farm with the greatest ease. Some salt was mixed with them, and occasionally a little sulphur, which is quite superfluous.

gestion very readily, and are not much liked. Few horses get them oftener than once a day. They may be given oftener, but the horse soon begins to refuse them. If they are to be used for several successive weeks, they should not be given oftener than once in twenty-four hours, or at most twice, and then not in very large quantities. When the quantity of food is limited, the horse will be glad to get them at all times, but in that case he must have little work. Straw, or hay, and turnips will make an idle horse fat; they will enable him to do some slow work, but to perform full work the horse will not or cannot eat enough to keep him in condition; and for fast work he would eat more than he could well carry. Most usually they are given only once a day, and at night after work is over; chaff or hay seed, and some corn, generally beans, are boiled along with them. They should always be washed. They require much boiling, and when large they may be cut.

Carrots.—This root is held in much esteem. There is none better, nor perhaps so good. When first given it is slightly diuretic and laxative. But as the horse becomes accustomed to it, these effects are not produced. Carrots also improve the state of the skin. They form a good substitute for grass, and an excellent alternative for horses out of condition. To sick and idle horses they render corn unnecessary. They are beneficial in all chronic diseases of the organs connected with breathing, and have a marked influence upon chronic cough and broken wind. They are serviceable in diseases of the skin. In combination with oats, they restore a worn-out horse much sooner than oats alone.

Carrots are usually given raw. Sometimes they are boiled or steamed, but horses seem to like them better raw. They are washed and sliced. They are often mingled with the corn, but I think they ought to form a separate feed. They diminish the consumption of both hay and corn. Some tell me that six, others that eight pounds of carrots are equal to four pounds of oats. But the calculation cannot be much depended upon, for the horse may eat more or less hay without the difference being observed. According to Curwen, a work-horse getting from eight to twelve pounds of corn, may have four pounds deducted for every five he receives of carrots. For fast working horses carrots never entirely supersede corn. Mention is made, indeed, of an Essex sportsman who gave his hunters each a bushel of carrots daily with a little hay, but no corn; the horses are said to have followed a pack of harriers twice a week, but the possibility of doing this needs further proof. For slow-working horses, carrots may supply the place of corn quite well, at least for those employed on the farm. Burrows, an English agriculturist, gave his farm-horses each seventy pounds of carrots per day, along with chaff and barn door refuse, with which the carrots were sliced and mixed. He gave a little rack-hay, but no corn. He fed his horses in this way from the end of October to the beginning of June, giving a little less than seventy pounds in the very shortest days, and a little more in spring.

The tops of the carrots have been given to horses, and it is said they were much liked, and quite wholesome.

Parsnips.—This root is used a good deal in France; in the neighborhood of Brest, parsnips

and cabbages are boiled together and given to the horses warm, along with some buckwheat flour. In the island of Jersey the root is much cultivated, and is extensively used for fattening stock, and for the table of all classes. It is said not to be generally given to horses, for it is alleged that their eyes suffer under its use. Arthur Young, however, assures us that the horses about Morlaix are ordinarily fed upon parsnips, and that they are considered "the best of all foods for a horse, and much exceeding oats." They are eaten both raw and boiled. They are most usually washed, sliced and mixed with bran or chaff. The leaves, mown while in good condition, are eaten as readily as clover.

Mangel-wurtzel, yams, and the turnip cabbage, have each been employed as food for horses, but I have not been able to learn with what effect.

Corn.—In this country the corn consists chiefly of oats, beans, and peas, but barley is now in very common use, and wheat is occasionally given. The two last articles, however, are rarely used to the exclusion of oats, but are generally mixed with them in certain proportions. Rye, buckwheat and maize, are used as corn in various parts of the world, but very little, or not at all, in this.

Oats.—There are several varieties which need not be described.

Good oats are about one year old, plump, short, hard, rattling when poured into the manger, sweet, clean, free from chaff and dust, and weighing about forty pounds per bushel.

New oats are slightly purgative, indigestible, and unprofitable. They seem to resist the action of the stomach, and to retain their nutriment. They make the horse soft; he sweats soon and much at work. If they must be used when under three or four months old, they may be improved by kiln-drying. They are not good, however, till they are about a year old. They may be kept till too old, when they become musty and full of insects. The period at which oats begin to degenerate depends so much upon the manner in which they are harvested and preserved, that the age alone affords no rule for rejecting them. They can be kept in good condition for several years.

Fumigated oats are those which have been exposed to the vapor of ignited sulphur. They are put through this process to improve their color. A good deal of the sulphur adheres to the husk of the oat, which is of a pretty color. A little sulphur cannot do the horse any harm, but light small oats absorb a considerable quantity. The sulphur is easily detected by rubbing the oats between the hands a little warmed. When the sulphur is in large quantity, the horses refuse the oats, or they do not feed heartily. I do not perceive that fumigated oats are objectionable in other respects.

Kiln-dried oats are those which have been dried by the application of fire. They are generally blamed for producing diabetes; but though this disease is common enough, it does not appear wherever kiln-dried oats are used. In many parts of Russia, oats and all other kinds of corn are kiln-dried in the straw before they are stored. It is not likely that this would be the case, if it were so prejudicial to the oats as many people imagine. Most of the kiln-dried oats which are given to horses have been damaged before they were dried and I suspect that the injury received in harvesting or in storing has more to do with diabetes than kiln-drying has.

Bad oats.—Some oats are light, containing little nutriment in proportion to their bulk; some contain much dust and chaff, small stones, and earth; these can hardly be called good oats, yet there are others which are much worse. Light, husky, and ill-cleaned oats may be sweet and wholesome; if they do little good they do no harm, but some oats are positively injurious to the horse. They may please the eye tolerably well, but they have a bad smell and a bitter disagreeable taste. Horses do not like them. After the first day or two they begin to refuse them. That which they eat produces diabetes, a disease which goes under many names. The most common are staling-evil and jaw-piss. I do not know how the oats obtain this diuretic property; many, as I have said, attribute it to kiln-drying, many to the oats having been heated, undergone a little fermentation in the stack or in the granary, and a few ascribe it to the oats being ill harvested, musty, or half-rotten before they are got off the field. Oats may be frost-bitten, damaged by insects, or injured in various other ways, but it seems yet uncertain what condition they are in when they produce diabetes; or what makes them so strongly diuretic. There is no doubt but heated oats will produce diabetes; but whether any other alteration in the oats will have the same effect I do not know. Whatever be the cause, the oats must be changed as soon as it is discovered that they produce

Diabetes.—It is the same disease as that which arises from the use of mowburnt hay. The horses urinate often; the urine is quite colorless, and it is discharged in immense quantities. The horse would drink for ever, and the water is hardly down his throat till it is thrown among his feet in the form of urine. In a day or two his coat stares, he refuses to feed, loses flesh, and becomes excessively weak. He may for a time continue at work, but, if he catch cold, and remain at work while he has both the cold and diabetes upon him he often becomes glandered.

The horses may not be all alike. In a large stud some are always more affected by these bad oats than others. The worst must go out of work for a while, and some others must be spared as much as possible, while a few may continue at their usual employment. The oats must be changed. Give plenty of beans, some barley, and good hay. Let each horse have a lump of rock salt, and a piece of chalk in his manger. Put some clay and bean-meal in the water. Carrots, whins, or grass may be given with benefit. But by changing the oats, and diminishing the work, the disease will generally disappear. If all these means fail, medicine must be tried. A veterinarian will furnish that of the proper kind. But nothing will arrest the disease permanently unless the oats be changed. If not very bad, they may do for horses in easy work. But while a horse has diabetes, he cannot maintain his condition for full work. He would lose flesh though he stood up to the knees in corn.

There is a kind of diabetes which does not proceed from bad food. It is accompanied with a good deal of fever, and requires different treatment; it may be suspected when the food has not been changed; but the eye is red, and the mouth hot, and the horse is dull for a day or two before the staling-evil is upon him.

Preparation of oats.—Most frequently oats are

given raw and whole. But occasionally they are bruised, or coarsely ground. Sometimes they are boiled, and sometimes germinated. There is no objection to bruising but the cost; grinding is never useful, and sometimes it is improper; boiling does not seem to improve oats, and, after the first week, high-fed horses prefer them raw; germination is rarely practised, and only for sick horses. In Lincolnshire oats are malted in salt water, and given, for three weeks or a month in spring.

Oats are sometimes given in the straw, either cut or uncut. The cost of thrashing is saved, but that is no great gain. It cannot be known how much the horse gets. One may be cheated altogether out of a meal and another may be surfeited. There is always some waste, for the horse must be getting very little corn if he eats all the straw he gets along with it, and, if he get more, some of the corn is left in the straw.

The daily allowance of oats is very variable. Hunters and racers receive almost as much as they will eat during the season of work. The quantity for those horses varies from twelve to sixteen pounds per day. Stage and mail-horses get about the same allowance. Some will not consume above fourteen pounds, others will manage nearly eighteen. In most stables some other corn is used. For every pound of barley or beans that may be given, rather more than an equal weight is taken off the ordinary allowance of oats. Saddle-horses receive about twelve pounds of oats, cart-horses from ten to fourteen. Those employed on the farm get from four to twelve pounds. The ordinary feeding measure in Scotland, termed a lippy, holds from three to four pounds of heavy oats.

Substitutes for oats have been frequently sought. Many experiments have been made to ascertain how far their use might be dispensed with. Roots and bread have both been tried, and the results have shown that horses of moderate work, or even laborious work at a slow pace, can be kept in good condition on carrots or potatoes, with some fodder and no corn. The bread has been made from corn, but it does not seem to have been productive of any economy. Barley, beans, peas, and wheat are partial substitutes for oats. They may form a large portion of the corn; and in Spain barley forms the whole of it. But in this country oats are in general as cheap as any of the other kinds of corn. It has been alleged that oats contain some aromatic, invigorating property, not possessed by other articles; and it does appear that horses fed on roots, to the exclusion of corn, are not so gay as corn-fed horses. But whether oats, in equal weight, give the horse more animation than other kinds of corn, is not known with certainty, although common opinion is in their favor.

Corn dust is a dirty, brown useless-like powder, removed from the oat in converting it into meal. It is sometimes mixed with the boiled food. It does not appear to contain any nutriment; and it is blamed for producing balls in the bowels and obstructing them.

Oat meal seeds.—The husk of the oat as it is sifted from the meal, is sometimes given to horses. This stuff is termed seeds. It always contains a little meal; but is often adulterated by adding what are called the sheeling seeds, the husk without

any meal. It does very well as a masticant; and may be mingled with oats, beans, or barley to make the horse grind them, but it cannot yield much nutriment, and many horses will not eat it.

Gruel is made from oatmeal. It is very useful for sick horses: and, after a day of severe exertion when the horse will not take solid food, gruel is the best thing he can have. Few stablemen are able to make it properly. The meal is never sufficiently incorporated with the water. One gallon of good gruel may be made from a pound of meal, which should be thrown into cold water, set on the fire and stirred till boiling, and afterwards permitted to simmer over a gentle fire till the water is quite thick. It is not gruel at all if the meal subside, and leave the water transparent. Bracy Clarke recommends that the meal be well triturated with a little cold water, in a beechen bowl, by a heavy wooden pestle. He thinks the trituration necessary to effect a union between the water and some constituent of the meal. This seems to be one of the "not a few useful and important discoveries" for which Mr. Clarke so clamorously demands our homage.

Oaten bread is sometimes given to sick horses. It may tempt the appetite and excite a disposition to feed.

Barley.—There is much difference of opinion concerning this article. Some consider it quite as good as oats in every respect; others allege that it is too laxative; others that it is heating; some that it is cooling; and some that it is flatulent. In Spain, and in some other places, horses and mules receive no corn but barley; in this country it is very often boiled and given once a-day, and sometimes a little is given raw with every ration of oats; and one or two proprietors have used, and perhaps still use it to the entire exclusion of oats. I cannot, from personal observation, tell what are its effects when given habitually without mixture. But when given along with a few oats or beans, so as to form only a part of the feed, I know that barley has none of the evil properties ascribed to it. I am daily among a large number of horses, both fast and slow-workers, who receive a considerable quantity in the course of the twenty-four hours. At first, it relaxes the bowels a little, and unless it be mingled with chaff the horses swallow the grain whole. They seem to swallow it more readily than oats. After a week or two the bowels return to their ordinary state. The skin and the coat are almost invariably improved by barley, particularly when boiled and given warm. Like every other kind of corn it is somewhat indigestible, until the stomach becomes accustomed to it. If much be given at first, the horse is likely to take colic. But by gradually increasing the quantity from day to day, deducting the oats in proportion, the horse may be safely inured to barley without any other corn.

White tells us of a Southampton postmaster, who fed his horses entirely on barley and cut straw. They were given together, and the barley was steeped in water twelve hours before it was given. Two pecks of barley and one bushel of straw formed the daily allowance. It is said that, upon this, "the horses did more work, and were in better condition, than others at the same task upon the ordinary feeding." This is the usual story whenever any new mode or article is recommended. But, nevertheless, it seems sufficiently

clear that barley is not much, if at all, inferior to oats. The price should influence the choice. Spotted or dark-colored barley, though rejected for malting, may be quite good enough for corn, and it is often to be bought at the price of oats. It weighs about fifty pounds the bushel. Giving weight for weight of oats, at forty pounds the bushel, there are only ten feeds, while barley gives twelve and one-half.

Boiled barley is used chiefly among stage, cart, and road-horses. It is rarely given to the racer or to the hunter, except when sick. Boiled to jelly, it is good for a hard dry cough, when there is no fever.

Barley mash—just barley steeped or boiled.

Malting barley is that which has been germinated. It is steeped or moistened, and spread in a layer till it sprouts. In that state it is given, though not very often. Horses are very fond of it, and they will take a little of this when they refuse almost every thing else. But I do not know how they would do upon it for constant use.

Malt is used a good deal on the continent, and is supposed to be highly nutritious, more so than the raw barley. But in this country the heavy duty upon malt forbids its use for horses; and it is not certain that the process of malting improves the grain so much as to pay its cost.

Malt dust, in some places termed *cumins*, is that portion of barley which sprouts in germination. It is generally given to cattle, but horses sometimes get it mixed with the boiled meat. They seem to like it very well. I do not know any more about it.

Grains, the refuse of breweries, are sometimes given to horses, and are eaten greedily; but it is alleged that, when given constantly, and so as to form the bulk of the corn, they produce general rotteness, which I suspect in this case means disease of the liver. They are also blamed for producing staggers and founder.

Barley dust is rather better than corn dust, but it is fitter for cattle or swine than horses.

Wheat.—There is a general prejudice against wheat as horse-corn, especially in its raw state. It is supposed to be poisonous; and without doubt many horses have been destroyed by it. Horses eat it very greedily, and are almost sure to eat too much, when permitted. Fermentation, colic, and death are the consequences; but these are easily avoided. The grain seems difficult to masticate and also difficult to digest, and colic may be produced more readily by one lippy of wheat than by two of oats. I have never known it used to the exclusion of oats, but it is sometimes given in quantities not exceeding four pounds per day, and that divided among five feeds. Given in this quantity and in this way, it does no harm that any other corn will not do; and it appears perfectly to supply the place of the oats which are withheld for it. For every four pounds of wheat, four pounds, or nearly four and a-half, may be deducted from the ordinary allowance of oats.

Still, unless the use of good wheat renders the feeding cheaper, I do not see that it has any good property to recommend it. If a stone of wheat can be bought for less money than a stone of oats or beans, it may form a part of the corn, using it at first very sparingly, and not exceeding the quantity I mention, four pounds per day. A larger quantity may be tried on two or three horses, but

as I have not seen it tried to a greater extent, I cannot tell what might be the result.

Wheat should never be given alone. Chaff, straw-chaff is best, serves to divide it, and ensures complete mastication. The wheat mixes better with the chaff when it is flattened with a pair of rollers.

Boiled wheat is in common use. It is boiled with beans and chaff, and generally forms the last feed, or the last but one, at night. It soon gets sour, and makes the mangers of wood very foul. No more should be boiled nor given than will be consumed before next morning. It should not be boiled to a jelly. It should always be mixed with chaff.

The husk of wheat is very useful, and employed in all town stables. It goes under several names, of which the principal are bran, and pollard, hen-meal, and gudgings. There are two kinds, the one much finer than the other. The coarsest is most usually termed bran; pollard is supposed to contain and to yield more nutriment; but the difference does not appear to be great.

Bran is seldom given in its dry state, but when beans or peas form the bulk of corn, some dry bran is added, to make the horse masticate them, and to correct the constipating property of these articles.

Bran-mash is the usual food of sick horses; it relaxes the bowels. Its laxative property has been supposed to depend upon mechanical irritation, which cannot be true, since bran is constipating to dogs. It contains little nutriment, but supplies the place of corn to an idle or a sick horse, when he must be kept low; and it helps to keep the bowels in order when the horse is confined to hay without corn. The bran-mash is given either cold or warm. Some horses like it better in one way than another; some will not eat it when mashed, but will take it dry, and a few seem to dislike it altogether. The *cold bran-mash* is usually made with cold water; as much being poured upon the bran as it will absorb. The *warm mash* is made with boiling water. The mash should be closely covered up till cool enough to be eaten. When oats, beans, and hay form the ordinary feeding, it is usual to give a large bran-mash, about half a pailful once a week. It relaxes the bowels, operating upon them very gently, and clearing out their contents. In Scotland, road and canal-horses work none on Sunday. On Saturday night they get a bran mash instead of their ordinary feed of corn; but when grass or boiled meat is in season, bran is not generally used in this way. When the horses are in high condition, with bowels liable to constipation, the bran-mash prevents any evil that might arise from Sunday's rest; but when low in flesh, doing all the work they can bear, they can hardly afford to lose a meal, even though they rest on Sunday. If the bowels be coative, the mash may be given, but the corn should be given too; not both together, for a bran-mash almost compels the horse to swallow his corn without mastication.

Many stablemen add bran to the boiled food. They seem to think its use indispensable; they talk as if the food could not be eaten or not boiled without the addition of bran. This is nonsense. The food may be of constipating quality, and bran will be wanted to correct that; or the horse's health or his work may make bran a useful article in his food. But to give bran as nourishment to a horse

under ordinary circumstances, is to give him almost the dearest food he can live upon, even when his work does not absolutely demand stronger food. A shilling's worth of oats is a great deal more nourishing than a shilling's worth of bran. To the horse, bran is just what gruel is to man; but the relative cost of the two is very different.

Wheaten bread, either brown or white, is much relished by nearly all horses. Occasionally it may be given to a horse that has been tired off his appetite, or to an invalid. It should never be less than twenty-four hours old, and it should be given only in small quantity. Bakers sometimes give their horses a good deal of it, but it ought to be mixed with chaff. Some will not eat it till it is mashed by pouring boiling water over it.

Buck-wheat, or brank, is hardly known in this country. It is used on the continent, and the horses are said to thrive on it. Young says that a bushel goes farther than two of oats, and that, mixed with at least four times as much bran, one bushel will be full feed for any horse for a week. The author of the Farmer's Calendar thinks he has seen it produce a stupifying effect; and Bracy Clarke says it appeared to him to be very laxative. In Holland and many parts of Germany and Norway, it is made into a black bread, with which the horses are fed.

Maize or *Indian-corn*, is much used as a horse-corn in America, and in various parts of Europe. Cobbett recommended its introduction, and among its other uses, spoke of horse-feeding. I do not know that it has been tried sufficiently to determine whether it might be used with advantage during a scarcity of other corn. Probably it ought to be boiled and mixed with chaff, but horses eat it greedily when raw. Bracy Clarke says it is apt to clog the stomach and affect the feet in such a singular way, that the hoofs frequently fall off when the horse is on a journey. He alludes to founder, but seems ignorant that any kind of corn, when improperly given, will produce the same effect. Perhaps maize does it more readily.

Rye is very generally employed as horse-corn in North America. It is coarsely ground, and sprinkled over straw and clover chaff, previously wetted, by which means the whole mass is well incorporated; mastication also is so much assisted, that no part is wasted, and the condition of the carriers' horses on the roads in Pennsylvania, where they are universally fed in this way, and are seldom lodged in a stable, proves the excellence of the practice. Rye is also used in Germany, but generally in the shape of bread made from the whole flour and bran; and it is not unusual, in travelling through some parts of that country, and of Holland, to see the postillions help themselves and their horses from the same loaf.*

Beans.—There are several varieties of the bean in use as horse-corn, but I do not know that one is better than another. The small plump bean is preferred to the large shrivelled kind. Whichever be used, the beans should be old, sweet and sound. New beans are indigestible and flatulent; they produce colic, and founder very readily. They should be at least a year old. Beans are often ill-harvested; and when musty or mouldy, though quite sweet internally, horses do not like them. They are often attacked by an insect which consumes much of the flour, and destroys the vital-

* British Husbandry, vol. i. p. 746.

ity of the rest. The ravages of the insect are plain enough. The bean is excavated, light, brittle, and bitter tasted. A few in this state may do no harm; but when the beans are generally infested, it is not likely that they are eaten with impunity, and very often the horse refuses them altogether. Damp, musty, ill-kept beans, though old, are as flatulent as those which are new. All kinds are constipating.

Though in very general use for horses, beans are not so extensively employed as oats. According to the chemists, they contain much less nutriment; but in practice it is universally allowed that beans are much the stronger of the two. The comparison however, is almost always made in reference to a measured quantity. A bushel of beans is, beyond all doubt, more nutritious than a bushel of oats, but it is questionable whether a pound of beans is stronger than a pound of oats. Beans weigh about sixty-three pounds per bushel, and if given in an oat measure the horse may be getting nearly double allowance. This, I am persuaded, often happens, and hence arise those complaints about the heating, inflammatory nature of beans. The horse becomes plethoric; the groom says the humors are flying about him. It is very likely that he would be in the very same state if he were getting an equal weight of oats.

If the beans do not afford more nutriment, weight for weight of oats, they at least produce more lasting vigor. To use a common expression, they keep the stomach longer. The horse can travel further; he is not so soon exhausted. "I remember," says Nimrod, "hearing Mr. Hoare exclaim, as his hounds were settling to their fox, 'Now we shall see what horses eat old oats, and what eat new.' I am inclined to think that this distinction may be applied to horses that eat beans, and those that eat none, for they help to bring him home at the end of a long day, and support his strength in the run." I believe Nimrod is quite right. In the coaching-stables beans are almost indispensable to horses that have to run long stages. They afford a stronger and more permanent stimulus than oats alone, however good. Washy horses, those of slender carcass, cannot perform severe work without a liberal allowance of beans, and old horses need more than the young. The quantity varies from three to six pounds per day, but in some of the coaching-stables the horses get more, a pound of oats being deducted for every pound of beans. Cart horses are often fed on beans, to the exclusion of all other corn, but they are always given with dry bran, which is necessary to keep the bowels open, and to ensure mastication. Beans are not in general use for race-horses, but are sometimes given to bad eaters. They are usually split and hulled, which is a superfluous process. For old horses they should be broken or bruised.

Some horses will not eat beans. The Irish horses, when first brought to this country, always refuse them; they invariably pick out the oats and leave the beans. It does not appear that they dislike them, for after they begin, they feed as well as other horses. Ultimately, they seem to discover that beans are for eating, although it is often a long time ere they make the discovery.

The horse however, may soon be taught. Let him fast for an hour beyond the feeding-time, and then give him half a ration of beans without oats.

If he still reject them, offer them split or broken, or moisten them, and sprinkle a little oatmeal over them, sufficient to make the beans white. If he still demur, put another horse, a hungry one, beside him, and he will soon teach his ignorant neighbor.

Bean-meal, or flour, is sometimes added to the boiled food; but it is oftener given in the water to cure the staling-evil.

Peas are seldom used without beans, with which they are mixed in large or small quantities. They may be given without either beans or other corn, but much care is necessary to inure the horse to them. Peas seem to be very indigestible, more so than beans, and perhaps as much so as wheat; but when given very sparingly at first, they may be used with perfect safety. It is often said that peas swell so much in the stomach as to burst it. This is an error. Peas do absorb much water, and swell more perhaps than beans, but they never swell so much as to burst the stomach, for the horse cannot or will not eat such a large quantity. When the stomach is burst it is from fermentation, not from swelling of the peas. All kinds of food will produce the same result when the horse is permitted to gorge himself, or when he is fed in full measure upon food that he has not been accustomed to; but peas seem to be rather more apt to ferment than some other corns.

Peas should be sound, and a year old. They weigh, on an average, sixty-four pounds per bushel. Pea-meal is sometimes given in the same way, and for the same purposes as that of the bean. Some prefer it for diabetes, and in a few places it is given in the water for baiting on the road.

Vetch seed has been employed for feeding horses, but I have learned nothing of the result.

Bread.—In former times it was customary to feed horses with bread, and the statute-book is said to contain several acts of parliament, relating to the manner of making it. Gervase Markham, a very old author, says, "Horse bread which is made of clean beans, clean peas, or clean fitches, feedeth exceedingly." It is not many years since a bread, composed of wheat, oats, barley, and beans, ground and mixed in varying proportions, was used in the racing-stables. The bread was well baked, and given when sufficiently old to crumble down and mingle with the corn. Eggs and some spices were sometimes introduced in making it. Nothing of the kind, so far as I know, is now used in this country.

In different parts of Europe bread forms the customary corn of the horses. A French periodical of 1828 mentions an agriculturist "who fed his horses with a bread composed of thirty bushels of oatmeal, and an equal number of rye-flour, to which he added a portion of yeast, and nine bushels of potatoes reduced to a pulp. With this bread he kept seven horses, each having twelve pounds per day in three feeds. It was broken into small pieces, and mixed with a little moistened chaff." He had fed his horses in this way for four years. Previously, he had used oats, hay, and straw chaff. The translator says he saved forty-nine bushels of oats in twenty-four days. But this is nonsense, for he had only seven horses. I take the quotation from "The Farrier and Naturalist," a dead journal.

The Magazine of Domestic Economy is not much better. The February number for 1837

tells us, that one ton of oats made into bread yields more nutriment than six tons of the raw article, and that in Sweden this has been proved by experience. It has never been proved in Scotland, and I dare say it never will. It is true, however, that a bread composed of oatmeal and rye, in equal quantities, has long been used for horses in Sweden. It is broken down and mixed with cut straw. It is in common use over different parts of Germany. I cannot learn any particulars as to the mode of making, nor of the quantity given nor of the horses' condition. In France many attempts have been made to produce a bread that would wholly or partially supersede oats, which seem to be comparatively precious on the continent. Buck-wheat, rye, barley, wheat, and potatoes have been tried in varying proportion, and, according to several accounts, with success. But it does not appear very distinctly why these articles should be converted into bread, which is a costly process, rather than given raw or boiled. It is indeed alleged that some of the constituent principles are not digestible until they have undergone fermentation; and it may be so, but no proof is shown that I have seen.

Linseed in small quantities, either whole or ground, raw or boiled, is sometimes given to sick horses. It is too nutritious for a fevered horse, but is very useful for a cough, and it makes the skin loose and the coat glossy. Half a pint may be mixed with the usual feed every night. For a cough it should be boiled, and given in a bran mash, to which two or three ounces of coarse sugar may be added.

Oil cake, ground and given in the boiled meat, when not very rich, consisting chiefly or entirely of roots, is much stronger than bran, and stronger, perhaps, than oatmeal seeds. Two to four pounds per day is the usual allowance. It makes the hair glossy. Horses seem to tire of it soon, but the farmer will find it useful for helping his horses through the winter.

Hempseed used to be given to racers a few days before running. It was supposed to be invigorating and "good for the wind." I believe it is not now employed, except occasionally to stallions during the travelling season. Some give four or six ounces every night.

Sugar.—Mr. Black, veterinary surgeon of the 14th Light Dragoons, informed me that sugar was tried as an article of horse food during the Peninsular war. The experiment was made at the Brighton depot upon ten horses, during a period of three months. Each got eight pounds per day, at four rations. They took to it very readily, and it was remarked that their coats became fine, smooth, and glossy. They got no corn, and only seven pounds of hay, instead of the ordinary allowance, which is twelve pounds. The sugar seemed to supply the place of corn so well, that it would probably have been given to the horses abroad. But peace came, and the circumstances which rendered the use of sugar for corn desirable, ceased. The horses returned to their usual diet; but several of those that were the subjects of this experiment became crib-biters.

That the sugar might not be appropriated to other purposes, it was slightly scented with asafetida, which did not produce any apparent effect upon the horses.

"Fruit, as gourds and sweet potatoes in

America; figs and chestnuts in Spain and Italy; apples in some parts of France; and numerous other fructified exotics, are occasionally employed as food for horses."* **Horse chestnuts**, it is said, "would probably form a valuable article of medicinal food for horses. In Turkey the nuts are ground, and mixed with other food; and they are regarded as a remedy for broken wind, and serviceable to horses troubled with coughs."† **Haws**, the fruit of the hawthorn, have been employed by West of Hampshire, as an article of food for farm-horses, with what profit I have not learned. "The people of Medjid feed their horses regularly on dates. At Deyrach, in the country of the Flassæ, dates are mixed with the clover. Barley, however, is the most usual food in all parts of Arabia."‡

Flesh.—The structure of the horse does not seem adapted to the assimilation of animal food. But some seem to have no dislike to it; and it is well to know that it may to a certain extent, supply the place of corn. I have seen them lick blood repeatedly and greedily. Bracy Clarke says he has "seen a well-attested account in a magazine, of a colt that was in the habit of visiting a pantry window which looked into his paddock, and of stealing and eating mutton, beef, veal, and poultry. Pork he seemed to reject. In the East Indies, meat boiled to rags, to which is added some kinds of grain and butter, is made into balls and forced down the horse's throat.—*Carpenter's Introduction to the Wars of India*. Also sheep's heads during a campaign are boiled for horses in that country."§

"While at the stable of Mr. Mellings, of Wakefield, the groom would let me see a flesh-eating horse. He brought about a pound of roasted beef and as much raw bacon, which he warmed. I took away the horse, while the groom put the meat in one corner of the manger, and a feed of oats in the other. I put in the horse and directed his nose to the corn, but he darted from that to the bacon, which he greedily devoured. He then ate his corn. The groom said this horse would finish the bone of a leg of mutton in a few minutes, and that roasted meat was his favorite dish."|| The wealthy people of Medjid frequently give flesh to their horses, raw as well as boiled, together with the offals of the table. "I knew a man at Hamah in Syria, who assured me that he had often given his horses washed meat after a journey, to make them endure it with greater facility. The same person related to me, that, apprehensive of the governor of the town taking a liking to his favorite horse, he fed it for a fortnight entirely on roasted pork, which raised its mettle to such a height that it became absolutely unmanageable, and could no longer be an object of desire to the governor."¶

Fish.—"In Iceland, it is stated by Buffon, that dried fish is made the food of horses; and my friend William Bullock, senior, lately informed me he saw them in the same practice in Norway."**

Eggs are sometimes given to stallions in the travelling season, for exciting desire, and to other

* Blaine's Vet. Outlines, p. 94. London, 1832.

† Comp. Grazer, p. 629. 1833.

‡ Past and present state of the English racer. Hookham, 1836.

§ Clarke, Pharmacop. Equina. Lond, 1833.

|| The Veterinarian, Vol. v. p. 25. Letter from Mr. Garland, V. S. Wakefield.

¶ Past and present state of the English racer. 1836.

** B. Clarke, Pharm. Eq.

horses for producing a smooth coat. They are quite useless for either purpose, at least as they are given, only one or two at a time. If they are to do any good the horse would need a dozen of them or thereabouts, I should think. One or two, however, can have no good effect. The egg is chipped, *starred* as they call it, all round, and given raw, like a ball.

Several, many horses have been lost by the egg sticking in the throat, and producing suffocation. If eggs must be given, let them be broken and mixed with a mash, or boiled hard and added to the corn. But I see no need for them in any shape.

Milk.—In this country, milk is not used as an article of food for grown-up horses. Occasionally it is given to stallions in the covering season. A mash is made of milk, bran, and oil-cake, ground; and in Ayrshire, whey is frequently given to stallions as a drink. It is supposed to be "amatory food." The Arabs, in traversing the Desert are said to give their horses camels' milk when forage fails. Major Denham, speaking of some horses he met with among the Tibboos, says—"two of them were very handsome, though small; and on remarking their extreme fatness, I was not a little surprised to learn that they were fed entirely on camel's milk, corn being too scarce and valuable an article for the Tibboos to spare them. They drink it both sweet and sour; and animals in higher condition I scarcely ever saw."*

Mares' Milk.—For the first six months of the young horse's life, his principal food is mare's milk. He begins to eat much sooner, but few are entirely weaned before this time. Farm mares are usually put to gentle work two or three weeks after parturition. Her work should be moderate and her diet substantial. She is often treated as if work could have no influence on the milk. When she has much to do, the milk is neither good nor abundant, and the foal is half-starved. The foal is sometimes permitted to follow his dam to the field, where he may occasionally suckle her. This renders the foal familiar, and at an early age reconciles him to subjection, and it prevents engorgement of the udder. Bad weather, or the nature of the mare's work, may forbid the practice. When the mare comes home, the foal is put to suck her. In some places, the milk is previously stripped on the ground, and the udder bathed with cold water, or vinegar and water. This is not necessary. It is supposed that the milk is injured and pernicious when the mare is over-heated; but, in the first place, her work should never be so severe as to over-heat her; and, in the second, the milk is not apparently altered when she is. Hard work will diminish the quantity of milk, and render it less nutritious, but it will do no more. If the foal be withheld till the udder be gorged and distended, a little inflammation will take place, and the milk will be bad. In such case it is proper to draw off a portion before the foal is put to it; and it may also be proper to bathe the udder with cold water. But to empty it or to bathe it merely because the mare has been perspiring, is absurd; and to neglect both mare and foal till the udder needs such treatment betrays very bad management.

* Denham's Travels in Africa.

THE HOLLOW HORN.—A FAIR OFFER.

From the Wayne Sentinel.

Within a few days we have heard several farmers from the surrounding country complain that their cattle have the hollow horn. We have had a little experience in the management of cattle, and know something about this "hollow horn," and we are satisfied that it is nothing more nor less than an attendant, a sort of hanger-on, of that worst of all diseases among cattle, the *hollow belly*. We know men who have cattle that during the whole winter have been exposed to the "pitiless peltings" of the storms, with a snowdrift or an ice cake for a bed, and with nothing but a scanty pittance of prairie hay or musty straw for food, and who now wonder that their cattle have the hollow horn! The wonder should be that they have any cattle living.

We will make the following proposals to all those owning cattle. Keep them under shelter during the storms and cold weather of next winter. A hovel, built of logs and covered with coarse hay or straw, standing in a dry place, is sufficient for this. Salt them twice a week regularly; give them a sufficiency of wholesome provender, and water at all times, and each of them a mess of potatoes or turnips at least two or three times a week. Keep your working cattle shod, and if you work them hard, feed and nurse them accordingly. Do not beat them; never let them stand in the cold longer than is absolutely necessary; particularly when you drive them to town with a load of grain or wood, or for any other purpose; do not let them stand in the street hungry and shivering, hour after hour, while you are in a grocery drinking and carousing. Follow these directions fairly, according to their true intent and meaning, and in the spring we will engage to pay for all the damage you have sustained by the "hollow horn."

HELIANTHUS, OR SUN-FLOWER PLANT.

From the Madisonian.

We presume that it is not generally known that this plant, which is often regarded as a worse than useless lumberer of the ground, is cultivated extensively in some parts of the United States, and turned to a very valuable account in a variety of ways. The versatility of its powers, so to speak, are even greater than the *morus multicaulis*. We have before us a letter from a firm in Pennsylvania which gives us some interesting facts, which we think are worthy of publicity.

The oil derived from the sun-flower seed is pretty well known. Its excellence for fancy painting and druggist use is said to be confirmed, and we are even told that it is equal, if not superior to almond or olive oil for table use. One acre of ground will produce from forty to fifty bushels of seed, and sometimes much more. Good seed will produce a gallon of oil to the bushel, and the oil has been sold at \$1.50 per gallon when flaxseed oil stood at 90 cents. The refuse after the oil is expressed, is said to be a valuable food for cattle.

The leaf is manufactured into cigars of a mild pleasant flavor, possessing, as it is said, powerful pectoral properties, highly commended by physicians in many diseases of the chest. The leaves,

properly cured, will bring from five to fifteen cents per pound.

The stalk, when stripped of the leaf and seed, may be burnt, and a superior alkali made from the ashes.

The comb of the seed, or properly the filaments of the flower, is excellent feed for cattle or hogs.

The helianthus is cultivated in the vicinity of York, (Penn.) and a gentleman in 1837, cultivated one hundred acres.

Extract from the "Essay on Calcareous Manures."

RECAPITULATION OF THE EFFECTS OF CALCAREOUS MANURES, AND DIRECTIONS FOR THEIR MOST PROFITABLE APPLICATION.

Under like circumstances in other respects, the benefit derived from marling will be in proportion to the quantity of vegetable or other putrescent matter given to the soil. It is essential that the cultivation should be mild, and that no grazing be permitted on poor lands. Wherever farm-yard manure is used, the land should be marled heavily, and if the marl is applied first, so much the better. The one manure cannot act by fixing the other, except so far as they are in contact, and both well mixed with the soil.

On galled spots, from which all the soil has been washed, and where no plant can live, the application of marl alone is utterly useless. Putrescent manures alone would there have but little effect, unless in great quantity, and would soon be all lost. But marl and putrescent matter together serve to form a new soil, and thus both are brought into useful action; the marl is made active, and the putrescent manure permanent. The only perfect cures that I have been able to make, at one operation, of galls produced upon a barren subsoil, were by applying a heavy dressing of both calcareous and putrescent manures together; and this method may be relied on as certainly effectual. But though a fertile soil may thus be created, and fixed durably on galls otherwise irreclaimable, the cost will generally exceed the value of the land recovered, from the great quantity of putrescent matter required. Much of our acid hilly land has been deprived, by washing, of a considerable portion of its natural soil, though not yet made entirely barren. The foregoing remarks equally apply to this kind of land, to the extent that its soil has been carried off. It will be profitable to apply marl to such land—but its effect will be diminished, in proportion to the previous removal of the soil. Calcareous soils are much less apt to wash than other kinds, from the difference of texture. When a field that has been injured by washing is marled, within a few years after many of the old gulleys will begin to produce vegetation, and show a soil gradually forming from the dead vegetables brought there by winds and rains, although no means should have been used to aid this operation.

The effect of marling will be much lessened by the soil being kept under exhausting cultivation. Such were the circumstances under which we may suppose that marl was tried and abandoned many years ago, in the case referred to in page 37. Proceeding upon the false supposition that marl was to enrich by direct action, it is most probable that

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it was applied to some of the poorest, and most exhausted land, for the purpose of giving the manure a "fair trial." The disappointment of such ill-founded expectations, was a sufficient reason for the experiment not being repeated, or being scarcely ever referred to again, except as evidence of the worthlessness of marl. Yet with proper views of the action of this manure, this experiment might at first have as well proved the early efficacy and value of marl, as it now does its durability.

When acid soils are equally poor, the increase of the first crop from marling will be greater on sandy, than on clay soils; though the latter, by heavier dressings and longer time, may ultimately become the best land, at least for wheat and for grass. The more acid the growth of any soil is, or would be, if suffered to stand, the more increase of crop may be expected from marl; which is directly the reverse of the effects of putrescent manures. The increase of the first crop on worn acid soil, I have never known under fifty per cent., and more often is as much as one hundred—and the improvement continues to increase, under mild tillage, to three or four times the original product of the land. [See Exp. 11, page 46, and Exp. 4 and 6.] In this, and other general statements of effects, I suppose the land to bear not more than two grain crops in four years, and not to be subjected to grazing—and that a sufficient cover of marl has been laid on for use, and not enough to cause disease. It is true, that it is difficult, if not impossible, to fix that proper medium, varying as it may on every change of soil, of situation, and of the kind of marl. But whatever error may be made in the proportion of marl applied, let it be on the side of light dressing, (except where putrescent manures are also laid on, or designed to be laid on before the next course of crops begins)—and if less increase of crops is gained to the acre, the cost and labor of marling will be lessened in a still greater proportion. If, after tillage has served to mix the marl well with the soil, sorrel should still show to any extent, it will sufficiently indicate that not enough marl had been applied, and that it may be added to, safely and profitably. If the nature of the soil, its condition and treatment, and the strength of the marl, all were known, it would be easy to direct the amount of a suitable dressing; but without knowing these circumstances, it will be safest to give two hundred and fifty, or three hundred bushels to the acre of worn acid soils, and at least twice as much to newly cleared, or well manured land. Besides avoiding danger, it is more profitable to marl lightly at first on weak lands. If a farmer can carry out only ten thousand bushels of marl in a year, he will derive more product, and confer a greater amount of improvement, by spreading it over forty acres of the land intended for his next crop, than on twenty, though the increase to the acre would probably be greatest in the latter case. By the lighter dressing, the land of the whole farm will be marled, and be storing up vegetable matter for its progressive improvement, in half the time that it could be marled at double the rate.

The greater part of the calcareous earth applied at one time cannot begin to act as manure before several years have passed, owing to the coarse state of many of the shells, and the want of thoroughly mixing them with the soil. Therefore, if

enough marl is applied to obtain its full effect on the first course of crops, there will certainly be too much afterwards.

Perhaps the greatest profit to be derived from marling, though not the most apparent, is on such soils as are full of wasting vegetable matter. Here the effect is mostly preservative, and the benefit and profit may be great, even though the increase of crop may be very inconsiderable. Putrescent manure laid on any acid soil, or the natural vegetable cover of those newly cleared, without marl, would soon be lost, and the crops reduced to one half, or less. But when marl is previously applied, this waste of fertility is prevented; and the estimate of benefit should not only include the actual increase of crop caused by marling, but as much more as the amount of the diminution, which would otherwise have followed. Every intended clearing of woodland, and especially of that under a second growth of pines, ought to be marled before cutting down—and it will be still better, if it can be done several years before. If the application is delayed until the new land is brought under cultivation, though much putrescent matter will be saved, still more must be wasted. By using marl some years before obtaining a crop from it, as many more successive growths of leaves will be converted to useful manure, and fixed in the soil—and the increased fertility will more than compensate for the delay. By such an operation, we make a loan to the soil, with a distant time for payment, but on ample security, and at a high rate of compound interest.

Some experienced cultivators have believed that the most profitable way to manage pine old fields when cleared of their second growth, was to cultivate them every year, until worn out—because, as they said, such land would not last much longer, no matter how mildly treated. This opinion, which seems so absurd, and in opposition to all the received rules for good husbandry, is considerably supported by the properties which are here ascribed to such soils. When these lands are first cut down, an immense quantity of vegetable matter is accumulated on the surface—which, notwithstanding its accompanying acid quality, is capable of making two or three crops nearly or quite as good as the land was ever able to bring. But as the soil has no power to retain this vegetable matter, it will begin rapidly to decompose and waste, as soon as exposed to the sun, and will be lost, except so much as is caught while escaping, by the roots of growing crops. The previous application of marl, would make it profitable in these, as well as other cases, to adopt a mild and meliorating course of tillage.

Less improvement will be obtained by marling worn soils of the kind called "free light land," than other acid soils which originally produced much more sparingly. The early productiveness of this kind of soil, and its rapid exhaustion by cultivation, at first view seem to contradict the opinion, that durability and the ease of improving by putrescent manures are proportioned to the natural fertility of the soil. But a full consideration of circumstances will show that no such contradiction exists.

In defining the term *natural fertility*, it was stated that it should not be measured by the earliest products of a new soil, which might be either much reduced, or increased, by temporary causes.

The early fertility of free light land is so rapidly destroyed, as to take away all ground for considering it as fixed in, and belonging to the soil. It is like the effect of dung on the same land afterwards, which throws out all its effect in the course of one or two years, and leaves the land as poor as before. But still it needs explanation why so much productiveness can at first be exerted by any acid soil, as in those described in the 14th experiment. The cause may be found in the following reasons. These soils, and also their subsoils, are principally composed of coarse sand, which makes them of more open texture than best suits pine, and (when rich enough) more favorable to other trees, the leaves of which have no natural acid, and therefore decompose more readily. As fast as the fallen leaves rot, they are of course exposed to waste—but the rains convey much of their finer parts down into the open soil, where the less degree of heat retards their final decomposition. Still this enriching matter is liable to be further decomposed and to final waste: but though continually wasting, it is also continually added to by the rotting leaves above. The shelter of the upper coat of unrotted leaves, and the shade of the trees, cause the first, as well as the last stages of decomposition to proceed slowly, and to favor the mechanical process of the products being mixed with the soil. But there is no chemical union of the vegetable matter with the soil. When the land is cleared, and opened by the plough, the decomposition of all the accumulated vegetable matter is hastened by the increased action of sun and air, and in a short time converts every thing into food for plants. This abundant supply suffices, to produce two or three fine crops. But now, the most fruitful source of vegetable matter has been cut off—and the soil is kept so heated (by its open texture) as to be unable to hold enriching matters, even if they were furnished. The land soon becomes poor, and must remain so, as long as these causes operate, even though cultivated under the mildest rotation. When the transient fertility of such a soil is gone, its acid qualities (which were before concealed in some measure by so much enriching matter,) become evident. Sorrel and broom grass cover the land—and if allowed to stand, pines will take complete possession, because the poverty of the soil leaves them no rival to contend with.

Marling deepens cultivated sandy soils, even lower than the plough may have penetrated. This was an unexpected result, and when first observed, seemed scarcely credible. But this effect also is a consequence of the power of calcareous earth to fix manures. As stated in the foregoing paragraph, the soluble and finely divided particles of rotted vegetable matters are carried by the rains below the soil; but as there is no calcareous earth there to fix them, they must again rise in a gaseous form, after their last decomposition, unless previously taken up by growing plants. But after the soil is marled, calcareous as well as putrescent matter is carried down by the rains as far as the soil is open enough for them to pass. This will always be as deep as the ploughing has been, and in loose earth, somewhat deeper—and the chemical union formed between these different substances serves to fix both, and thus increases the depth of the soil. This effect is very different from the deepening of the soil by letting the plough run into the barren subsoil. If by this mechani-

cal process, a soil of only three inches is increased to five, as much as it gains in depth, it loses in richness. But when a marled soil is deepened gradually, its dark color and apparent richness is increased, as well as its depth. Formerly single-horse ploughs were used to break all my acid soils, and even they would often turn up subsoil. The average depth of soil on old land did not exceed three inches, nor two on the newly cleared. Even before marling was commenced, my ploughing had generally sunk into the subsoil—and since 1825, most of this originally thin soil has required three mules, or two good horses to a plough, to break the necessary depth. The soil is now from five to seven inches deep generally, from the joint operation of marling and deepening the ploughing a little in the beginning of every course of crops.

How destructive to the power of soil this depth of ploughing would have been, without marling, may be inferred from the continued decrease of the crop, through four successive courses of a very mild rotation, on the spot kept without marl in experiment 10. Yet the depth of ploughing there did not exceed six inches, and depths of nine and even twelve inches were tried, without injury, on parts of the adjacent marled land.

Besides the general benefit which marling causes equally to all crops, by making the soils they grow on richer and more productive, there are other particular benefits which affect some plants more than others. For example, marling serves to make soils warmer, and thereby hastens the ripening of every crop, more than would take place on the like soils, if made equally productive by other than calcareous manures. This quality of marled land is highly important to cotton, as our summers are not long enough to mature the later pods. Wheat also derives especial benefit from the warmth thus added to the soil: it is enabled better to withstand the severe cold of winter; and even the short time by which its ripening is forwarded by marling, serves very much to lessen the danger of the crop from rust. Wheat also profits by the absorbent power of marled land, (by which sands acquire, to some extent, the best qualities of clays,) though less so than clover and other grasses that flourish best in a moist climate. Indian corn does not need more time for maturing than our summers afford (except on the poorest land,) and can sustain much drought without injury; and therefore is less aided by these qualities of marled land. Most (if not all) the different plants of the pea kind, and all the varieties of clover, derive such remarkable benefit from marling, that it must be caused by some peculiarity in the nature of those plants. Perhaps a large portion of calcareous earth is necessary as part of their food, to aid in the formation of the substance of plants as well as to preserve their healthy existence.

On acid soils without manure it is scarcely possible to raise red clover—and even with every aid from putrescent manure, the crop will be both uncertain and unprofitable. The recommendation of this grass as part of a general system of cultivation and improvement, by the author of "*Arator*," is sufficient to prove that his improvements were made on soils far better than such as are general. Almost every zealous cultivator and improver (in prospect) of acid soil has been induced to attempt clover culture, either by the recommendations of

writers on this grass, or by the success witnessed on better constituted soils elsewhere. The utmost that has been gained by any of these numerous efforts, has been sometimes to obtain one, or at most two mowings, of middling clover, on some very rich lot, which had been prepared in the most perfect manner by the previous cultivation of tobacco. Even in such situations, this degree of success could only be obtained by the concurrence of the most favorable seasons. Severe cold, and sudden alternations of temperature in winter and spring, and the spells of hot and dry weather which we usually have in summer, were alike fatal to the growth of clover, on so unfriendly a soil. The few examples of partial success never served to pay for the more frequent failures and losses; and a few years' trial would convince the most ardent, or the most obstinate advocate for the clover husbandry, that is introduction on the great body of land in Lower Virginia, was absolutely impossible. Still the general failure was by common consent attributed to any thing but the true cause. There was always some reason offered for each particular failure, sufficient to produce it, and but for which (it was supposed) a crop might have been raised. Either the young plants were killed by freezing soon after first springing from the seed—or a drought occurred when the crop was most exposed to the sun, by reaping the sheltering crop of wheat—or native and hardy weeds overran the crop—and all such disasters, were supposed to be increased in force, and rendered generally fatal, by our sand soil, and hot and dry summers. But after the true evil, *the acid nature of the soil*, is removed by marling, clover ceases to be a feeble exotic. It is at once naturalized on our soil, and is able to contend with rival plants, and to undergo every severity and change of season, as safely as our crops of corn and wheat—and offers to our acceptance the fruition of those hopes of profit and improvement from clover, with which heretofore we have only been deluded.

After much waste of seed and labor, and years of disappointed efforts, I abandoned clover as utterly hopeless. But after marling the fields on which the raising of clover had been vainly attempted, there arose from its scattered and feeble remains, a growth which served to prove that its cultivation would then be safe and profitable. It has since been gradually extended nearly over all the fields. It will stand well, and maintain a healthy growth on the poorest marled land: but the crop is too scanty for mowing, or perhaps for profit of any kind, on most sandy soils, unless aided by gypsum. Newly cleared lands yield better clover than the old, though the latter may produce as heavy grain crops. The remarkable crops of clover raised on very poor clay soils, after marling, have been already described. This grass, even without gypsum, and still more if aided by that manure, may add greatly to the improving power of marl: but it will do more harm than service, if we greedily take from the soil too large a share of the supply of putrescent matter which it affords.

Some other plants, less welcome than clover, are equally favored by marling. Greensward, blue grass, wire grass, and partridge pen, will soon increase so as to be not less impediments to tillage, than evidences of an entire change in the character and power of the soil.

If the foregoing views may be confided in, the

general course most proper to pursue in using calcareous manures may thence be deduced without difficulty. But as I have found, since the publication of the first edition of this essay, that many persons still ask for more special directions to guide their operations, and as all such difficulties may not be entirely obviated even by the more full details now given, I will here add the following directions, at the risk of their being considered superfluous. These directions, like all the foregoing reasoning, may apply generally, if not entirely, to the use of all kinds of calcareous manures, and to soils in various regions: but to avoid too wide a range, I shall consider them as applied particularly to the poor lands, and to the fossil shells, or marl, of the tide-water region, and addressed to persons who are just commencing their improvements.

As the cheapest mode of furnishing vegetable matter to land intended to be marled and cultivated, no grazing should be permitted. It is best to put the marl on the grass previous to ploughing the field for corn, as the early effect of this manure is greatest when it has been placed in contact with the vegetable matter. But this advantage is not so great as to induce the ploughing to be delayed, or to stop the marling after that operation. When the marl is spread upon the ploughed surface, it can be better mixed with the soil, by the cultivation of the crop—and this advantage in some measure compensates for the loss of that which would have been obtained from an earlier application on the sod. If marl is ploughed in, it should not be so deeply as to prevent its being mixed with the soil, speedily and thoroughly, by the subsequent tillage. To make sure of equal distribution, the marl should be spread regularly over the surface. From neglect in this respect, a dressing of marl is often too thin in many places to have its proper effect, and in others, so thick as to prove injurious. Hence it is that marl-burnt stalks of corn, and tufts of sorrel are sometimes seen on the same acre.

After the first year, the farmer may generally marl fast enough to keep ahead of his cultivation: and even though he should reduce the space of his tillage to one-half, it will be best for him not to put an acre in corn without its being marled. Fifty acres can generally be both marled and tilled, as cheaply as one hundred can be tilled without marling; and the fifty will produce as much as the hundred, in the first course of crops, and much more afterwards.

That rotation of crops which gives most vegetable matter to the soil, is best to aid the effect of marl recently applied. The four-shift rotation is convenient in this respect, because two or three years of rest may be given in each course of the rotation at first, upon the poorest land; and the number of exhausting crops may be increased first to two, then to three in the rotation, as the soil advances to its highest state of productiveness.

After marling, clover should be sown, and gypsum on the clover. On poor, though marled land, of course only a poor growth of clover can be expected; but wherever other manures are given, and especially if gypsum is found to act well, the crop of clover becomes a most important part of the improvement by marling. Without clover, and without returning the greater part of its product to the soil, the great value of marling will not be seen. A small proportion of the clover may be

used as food for cattle; and in a few years this small share will far exceed all the grass that the fields furnished before marling, and the limitation of grazing. What is at first considered as lessening the food of grazing stock, and their products, within a few years becomes the source of a far more abundant supply.

During the first few years of marling, but little attention can (or ought to) be given to making putrescent manures, because the soil much more needs calcareous manure—and three acres may generally be supplied with the latter, as cheaply as one with the former. But putrescent manures cannot any where be used to so much advantage, as upon poor soils made calcareous, and no farmer can make and apply vegetable matter as manure to greater profit than he who has marled his poor fields, and can then withdraw his labor from applying the more to the less profitable manure. After the farm has been marled over at the light rate recommended at first, every effort should be made to accumulate and apply vegetable manures, and with their gradual extension over the fields a second application of marl may be made, making the whole quantity in both the first and second marling, 500 or 600 bushels to the acre, or even more, which would have been hurtful if given at first, but which will now be not only harmless, but necessary to fix and retain so much putrescent and nutritive matter in the soil.

If the course here advised is pursued on poor and acid soils, the products will be generally doubled in the first course of the rotation—often in the first crop immediately following the marling: and the original product may be expected to be tripled by the third return of the rotation. This will be from merely applying marl in sufficient (and not excessive) quantities, and giving the land two years' rest in four, without grazing. But with the aid of farm-yard and other putrescent manures, and of clover, both of which should be largely in use during the second course of crops, still greater returns may be obtained.

OBSERVATIONS ON THE EARLIEST MARLED DISTRICT OF PRINCE GEORGE COUNTY,

Introductory to Queries and Answers in regard to the marling there.

BY THE EDITOR.

The portion of Prince George county to which the following observations apply, is of very uniform character. It lies between Powell's creek and Bailey's creek, which empty into James river about 8 miles apart. The head-stream of Powell's creek, the Birchen swamp, or rather its eastern slope, may be considered as the eastern boundary, and the western is the Branchester mill stream, or eastern source of Bailey's creek. A line connecting the head springs of these two streams is the southern limit. James river forms the northern. The space included is from 7 to 9 miles across in both diameters.

There are numerous smaller streams and rivulets, besides the two already named; and they are generally bordered by strips of alluvial low-ground, of sizes proportioned to the streams, and varying

from 10 yards, or even less, to 80, or rarely 100, where widest. These lands are sandy, but originally very rich; and, excepting some of the river banks and borders, were the only really rich land in this district, or in the county. From these narrow low-grounds, the land rises in hill-sides, generally not too steep for the plough, to the summit ridges, which are 80 or 100 feet higher than the streams. The highest, or ridge land, was originally poor and acid soil, bearing pines principally, with some oak, and whortleberry bushes. The slopes between these extremes of elevation form the greater part of all the surface. They are lighter, and originally much richer than the ridges, though far from being good, and still less are they durable land. This kind is generally what was called "free light land."

The table land generally approaches the river very nearly without much diminution of height, being 80 to 100 feet above the tide-water. But the otherwise general level is broken by many deep and narrow valleys, or glens, with very precipitous sides, and which extend backward from the river, rarely more than half a mile, and generally not so far. Just as far as these deep natural ravines extend, was the land originally of much better quality than beyond, where the soil is that of the poor ridges. Within the extent of the ravines, the soil is usually better as the river is approached; and, for a small space, near the extremity of the table land, the original quality was very fertile.

A still more striking peculiarity of this district, and precisely limited by the two creeks, is the space between the table land and the river. This strip, varying in width from 20, or less, to more than 160 yards, and more than 10 miles in its circuitous length, may be designated as the *broken banks* of the river. This strip is a succession of irregular natural terraces, descending from the table land to the river, by several precipitous hill-sides, between which the narrow strips of land are either level, or rising in the direction opposite to that of the general declivity.

This strip of land has generally been long cleared, and greatly exhausted. A part on Coggin's Point farm was cleared by myself, and a narrow strip still remains under its original forest growth; and both, as well as smaller spots elsewhere, show great fertility of soil. But though this must have been the general character of the whole, still, even in the virgin land, there were frequent and sudden transitions from one kind of soil to another the most different in character. The soil generally is a rich, dark, sandy, and sometimes gravelly loam; but, from this, a distance of ten yards will often bring the observer to a barren sand, sometimes silicious and sometimes calcareous, or barren clay, or to naked shell marl, as barren as either. These sudden changes were to me for a long time incomprehensible, as well as the singular shape of the surface, until both were explained by later observation. Not more than 12 years ago, there occurred on the adjacent higher ground of the Tarbay farm, two cases of "land-slips" on subsidence and moving of the surface, which clearly showed that all the extent of broken banks had been formed in remote times in the same manner. Hence the broken strata, and the perpendicular termination of each, and every stratum being brought somewhere to the surface.

Under the whole of this curious strip lies shell marl, of a dingy, yellowish-white color, and the shells, or their fragments, mixed with a large proportion of coarse sand. The beds are generally soft and easy to dig, owing to the great quantities of sand. Under this marl throughout lies a lower bed, of unknown depth, of what was originally similar marl, but which now has remaining not a particle of shell, or calcareous matter. This is the great body of what I called "gypseous earth," in my account of it at page 207 of Vol. I. of Farmers' Register, and which is called the "green-sand" formation, in the reports of the geological survey since made.

These remarkable broken banks, (far more valuable than all the *unbroken banks*, if any deserve now to be so considered,) though requiring this notice because of their singular character, form but a very small portion of the surface of this district; and the good table lands adjoining make not much more.

It would be difficult to conceive any connexion between the existence of the deep and steep-sided glens which stretch back from the river, and the better quality of the close adjacent table land; yet they are always found together. In speaking of one of the farms, Tarbay, many years ago, I said it was a great pity that the otherwise level high-land should be so much cut up by the deep river ravines. An old and observant farmer, to whom I addressed the remark, answered that, on the contrary, he thought it was to be regretted that the ravines did not extend back much farther; as it was certain that the good land ceased with them, and that all from immediately beyond them was totally worthless.

The sides of these glens present the most precipitous natural surface to be found in the lower country; and in that respect are more like mountain lands than any thing below. They cut through the different horizontal strata, and of course present sections of soil of various textures and qualities. But all the surface is fertile at first under cultivation, and continues so until the soil is washed off; and before clearing, the whole of these steep lands were covered with a magnificent forest growth, of different kinds of trees indicative of fertile soil.

But for the existence of these deep ravines, and of the broken banks of the river, both of which have been produced subsequently to the general formation, the high river lands might generally be termed level. And both in that view, and in the actual variation from the original level, these lands offer a very strong contrast to the surface of all others back from the river. The latter are no where level, except on the summit ridges, and in the narrow low-grounds. The much larger proportion of intervening lands, and which I have above and elsewhere called slopes, are gently, though variously, inclined, and are rarely too steep to be subjected to the plough, but steep enough to be greatly and generally washed, deprived of soil, and gullied, by the abuse of tillage. When first cleared, nearly all these slopes, and of course much the greater part of the whole district under consideration, was what was called in common parlance "good land;" that is, it was productive, (comparatively, at least,) for a few years. But nearly all soon lost this early value, and the land remained poor afterwards, and hopeless of improve-

ment, until the discovery and use of its now great means for improvement, shell marl.*

Shell marl is visible on some low part of almost every farm in this region, and on all the tributary streams of Powell's creek. Yet all the land surrounding and drained by the next large tide-water creek below (Ward's creek) is believed to be destitute of marl. The same absence of marl is in the basin of the Appomattox river, which is the next tributary of James river above Bailey's creek. Again, on the several streams which rise in this county south of the creek spoken of, and which flow to Blackwater river, and thence to the waters of North Carolina, marl has recently been found in abundance, though not known to exist there, near the surface, or where accessible, until within the few last years. From the different character of the surface of the land on these waters, the greater extent of poor ridge, and of level and yet unexhausted, though naturally poor land, this region is greatly more fitted to be improved by marl than the district which is the particular subject of consideration here. It is very certain, that the originally poor and acid ridge land is more improved by marling, and yields more profit from that improvement, than the "free light land," or slopes of much better original rate of productiveness.

When I first became a proprietor and cultivator in this neighborhood, (where also I had been born and reared,) nearly all the slopes had been cleared, and worn down to a product sometimes of ten bushels of corn per acre, or three or four of wheat, and more generally of five bushels of corn, and no wheat. I speak of land still kept in cultivation; for much had been turned out, as still more worthless, to grow up again in pines. The little better land off the river consisted of a small quantity of manured tobacco lots around the houses, perhaps rather more of the narrow low grounds or small streams, and annual clearings of new ground, of slope land, as long as any such wood-land was left to be cut down. The level ridge land was counted as worthless, and was not cleared except where there was no better. A very high comparative estimate of value was placed on these narrow low-grounds, because they were almost the only rich natural land. I remember to have heard the Bonaccord farm spoken of frequently in former times as one of the best inland tracts in the county, because "it had such beautiful low-grounds." The farm, of more than 400 acres of arable land, then had, as part of it, about 50 acres of the Birchen swamp, of the general quality before described, rich, but sandy, subject to overflow by every heavy rain, and altogether badly drained and cultivated, and very uncertain in product. Still, this small proportion of better soil gave character and reputation to the whole farm, and compensated, in common opinion, for the great poverty of 500 to 600 acres of high-land. Now, and for some years back, the high-land is generally marled; and so superior is its value to the formerly highly prized low-grounds, that the proprietors would gladly have the low-grounds substituted by as much of the poorest ridge land, if convenient to be marled.

* The peculiarities of the "free light land" of the slopes, as well as of the level summit "ridges," have been also treated of by the writer, at pages 11 and 54 of the 'Essay on Calcareous Manures,' and at page 168 of this volume of Farmers' Register.

Yet the low-grounds are better drained and better tilled than formerly, and, therefore, doubtless of greater productive value.

Such, for the greater part, were all the farms of this neighborhood. Those on the river had more or less of the richer river banks, both the broken and the high. Some, both on and off the river, had more or less of the narrow low-grounds formerly rated so high, and which now are almost deemed an objection to any property. But the greater part, and sometimes nearly the whole of every farm, was of the mean and worn high-land above described.

It was under these very disadvantageous circumstances, that in January 1818 the use of marl was first commenced successfully by myself, and thereafter continued regularly, on Coggins' Point farm, my then residence and sole property. At first, general doubt, or incredulity, as to the value of the effects, caused other persons to be slow and hesitating in following my example; and, even when they became sufficiently confident, ignorance of the mode of operation of the manure, and the consequent want of judgment in its use, caused the practice to be but little beneficial. Hence, nearly all the early practice was more or less wrong, and, in part, either unproductive, or injurious; and it is in the labors of the late beginners, (late because either not before possessing the land, or not having discovered marl earlier thereon,) that the most rapid progress and best of early results are to be seen. Still, every one's practice is defective; and not one, (and I except not myself,) has pursued fully the proper course to gain the best profits from marling. Hence, the evidence now to be drawn, and such as will be presented, from the earliest practice, and that which only can show the durable effects of marl, is by no means so strong as will hereafter be the experience of persons who have more recently begun the use, and in a more judicious manner, became better informed as to the benefits, and warned, by the errors and losses of the early operators, against following their bad example.

But the general injudicious procedure of the early marlers is not to be wondered at. In truth, there was not, and is not yet, a single good farmer in the whole district. There are, indeed, a large proportion of the proprietors who, since they began to marl, have greatly improved their land, and greatly increased their income and property. But still there is seen every where, without exception, want of economy, of skill and management in practice, and want of general knowledge of, or regard to, the true principles of agriculture.

Such was the land, and such are the proprietors whose practice and results in regard to marling are set forth in the answers to the queries which will follow. And this general statement will perhaps suffice to show clearly, even to those who have no personal acquaintance with the land and its circumstances, that the true estimate of the value of marl as manure, and of the intrinsic value of land to which marl can be easily applied, are not to be measured or limited by the amount of effects produced and now remaining in this district, or by the profits actually secured by the cultivators; great as are the actual improvements, and profits thence derived.

Good and bad land, or fertility and worthlessness of soils, are comparative terms; and to un-

derstand their force we should always consider the general circumstances of the region where they are used. Thus, in this formerly very poor region, persons consider and speak of land being highly and profitably improved, by marling, when the actual improved product is not more than 25 bushels of corn, and on some farms is not more than 15 bushels to the acre. To offer such statements of product as evidences of great increased value must seem ridiculous to the cultivators of very fertile lands, who would regard as contemptible even the best of the above rates of product. Thus, for example, in one of the early numbers of the 'Cultivator,' in an article on the culture of corn, by Judge Buel, it is assumed that a crop of 30 bushels of corn per acre is necessary to return the actual expenses of tillage, &c., and therefore that any less product leaves a balance of loss to the farmer. (See Farmers' Register, page 65, vol. ii.) Again, in an article in a Tennessee agricultural paper which has been received since this article was commenced, the writer states and deplors the ruinous exhaustion of the formerly rich lands, which he says are so reduced as to bring no more than 25 bushels of corn to the acre. Now, with all that can be claimed for the present improvement by marl of the poor lands of Prince George, I must frankly admit that generally they have not yet equalled either the 30 bushels, which Judge Buel considered as barely enough to save the cultivator from absolute loss, or the 25 bushels, which in Tennessee is stated as a rate of great impoverishment. Still, even the small products of 15 to 25 bushels of corn, usually made now on the marled lands, are from twice to four times as much as was derived from the same lands before marling.

But let me not be understood as meaning that the usual improved products show the universal or the maximum rate. Some land in this district, previously very poor, (though not the most reduced,) from marling alone, will now produce 35 bushels to the acre; and with proper use of available means, and such judicious and economical farming as would tend to produce the greatest net income, I can entertain no doubt that these marled lands may be generally brought to a product of 50 bushels of corn, or more, to the acre.

To those who would under-rate the value of marl because of the usual low rate of product yet attained, or who would measure the improved products here by comparison with those of good farming regions elsewhere, I beg leave to address a few explanations, which will be altogether superfluous to others who well know the former and present state of the land and the farming here.

No person could now examine these or any marled lands, without being convinced of there having been produced great and valuable improvements. Still, for one to give due appreciation to the new condition of things, he ought to know the previous condition of the land and farming, of which I shall here state the principal features, generally and briefly.

Before marling was here commenced, it was not only generally the case that the system of cultivation was exhausting, and the already poor and reduced fields becoming still more unproductive, but I assert, without fear of contradiction, that there was not one individual then enriching his land, taken throughout, in the slightest degree, or

increasing on former products, on a general average of his farming, by fertilization. If it be permitted to refer to my own case as the most striking evidence, I claim that there was not wanting on my part, from my beginning labors in 1813, either zeal to improve, present sacrifices for the object, or mildness of the course of cropping to my fields. In these respects, at least, none went farther or did more; and yet after six years of such ill directed but zealous labors, the added enrichment of some parts of my land was not enough to compensate for the washing and other injury to other parts. In fact, new clearings, or new lands otherwise brought under culture, served as the only means of maintaining former products.

At that time, and until about 1820, there was scarcely a proprietor in the district, who would not have been glad to sell his land at less than the common estimate of value, low as that was, and remove to the rich and far west. If any one were an exception, he was held to his land by some other and stronger inducement than the profit he derived from farming, or his expectations of increasing the product. It might have been said that almost every farm was in market; though not actually offered for sale, because of the impossibility of finding purchasers at any prices.

At the present time, every proprietor has marled to a greater or less extent, and with more or less benefit; and even those who have been the least judicious in the process, and therefore have obtained the smallest profits therefrom, are as much as any others convinced of the greater benefits to be obtained by better conduct; and they appreciate their means for improvement, even if they have not yet properly or profitably availed of them. Not a single individual in this district has emigrated to the west after having begun to marl, or who possessed the means of marling. The demand of those who would gladly purchase now exceeds the supply of land for sale; and, indeed, there is no farm or piece of land which can now be brought at its present estimated value; unless it is burdened by some peculiar evil or disadvantage.

In regard to the answers to the queries which will be hereafter submitted, it is proper to observe that the individuals who were applied to were not selected because they had marled the most judiciously and profitably, but because their practice was either among the oldest or the most extensive in the district of which full and correct information could be obtained. In several cases of extensive and profitable marling, the deaths of the improvers, and their successors being unacquainted with the former state of things, have debarred me from obtaining evidence of facts which would have been among the most valuable. Further, in the statements which will be presented, the oldest experiments, and practice, which would otherwise be the most valuable and instructive, were generally, indeed in every case, much lessened in effect and profit, by improper treatment. Those persons who have commenced within the last few years, may and generally will do much better than all who preceded them; as they now understand, from the example, and the ill as well as the good management of their predecessors, what cause will lead to the greatest profits, and what to the heaviest losses from marling. And though the present general course of cropping and manage-

ment of each of the individuals is certainly meliorating to the land, in some degree, since and by aid of marling, yet the mildest and best management among them would still be exhausting, if pursued without marling.

It was after almost five years' absence from nearly the whole of my old neighborhood and still longer after an entire change of my former pursuits, that I recently visited and examined the farms of several of my former neighbors, and saw the progress of improvement, which in general is much greater, in these last five years, than in the previous fifteen. The facts which go to show the durability of the improvements by marling, (and which were most sought to be obtained, as being certainly the most important,) will best appear from the answers to the general queries. But a few other facts, not therein embraced, will be here stated in advance.

On Bonaccord, the farm of James B. Cocke, there is a newly cleared field of 100 acres, lying along the eastern side of the public road, and in view of every traveller. But the field does not appear to such advantage from the road, as when entered and more closely examined. This land formerly was (as still is the woodland on the northern, eastern and southern sides) the ordinary poor ridge soil. The field is now covered with a crop of red clover, that is more than knee high, and which would seem to indicate that either 30 bushels of corn to the acre, or 15 to 18 of wheat, might be expected from the land next year. This land, without marl, would not have produced more than 10 to 12 bushels of corn in its best state, to sink in a few crops to less than 8 bushels; not enough wheat at any time to pay for the sowing—and clover could not have lived on it at all.

On Coggins' Point farm, there are still kept unmarled the spots left for experiment, when the surrounding land was marled, in 1820 and 1821, and 1828, and of which the comparative products were reported at pages 41, 43, and 45 of 'Essay on Calcareous Manures.' These spots have been secured from grazing since 1814, and also have had all the benefit, if any, of being rested two years in each rotation of four. They are still wretchedly poor; and appear now, as from the several former measurements made and reported, not to have improved in the least, on account of their long-continued mild treatment.

The farm of Mr. William Wilkins formerly had the reputation of being the poorest in the neighborhood. The industrious young owner commenced marling it in 1835, not long after acquiring possession; and already it presents, throughout its whole length, along which the public road passes, not only a remarkable improvement upon its former very poor state, but a degree of general productiveness that would be striking even to an observer who judged merely of present appearances. Good clover is covering land on which not the feeblest growth could have been produced before marling; and corn, of the first year's growth on pine old field, (the pine trees killed by belting, and all left standing,) now promises a product of 30 bushels to the acre this season. No one has done better than this young man in marling, and increasing profitably the value of his before miserably poor land. One of the main causes of his success has been his general practice of adding leaves raked from the wood land, to all his applications of marl to old land. It deserves men-

tion, also, that there was no marl on this farm, that was worth using; and that Mr. Wilkins has had to contend with the unusual difficulty of having to draw all his marl from the pits of his neighbors. Though his answers to my queries will be given, still his experience, as well as that of some others, is yet too limited for their reports to be of much value in regard to long continued or permanent results, and the main profits, which of course are not to be obtained in the first few years.

The field on the extremity of Jordan's Point, which will form one half of the ground for Dr. Theodrick Bland's answers, in former times was even more noted for its fertility and durability than the land just before mentioned for its poverty and incapability of being improved by any means then known. This celebrated "Point Field" contains 125 acres altogether, and is of the same kind of chocolate colored loam, (commonly called "mulatto land,") and presenting a like surface and elevation, as are found in the best parts of Shirley, Eppe's Island, Westover, Sandy Point, and Brandon. There is not an acre of other land of this kind in all this district of Prince George county. But its former great productiveness and beautiful appearance had been greatly deteriorated by a long continuation of incessant and bad culture. I rode over this field about 12 years ago, and saw it in a worse state than I had supposed such land could have been possibly reduced to; for, in addition to great general exhaustion, the surface was galled, and the mould washed away, leaving the barren subsoil naked, wherever there was the most gentle declivity. Yet the surface is generally what would be termed level, and the undulations are very gentle. When I again viewed this field within a few weeks past, all these before naked galls, as well as the field generally, were covered with a rank growth of clover and weeds, manifesting the restoration every where of fertility as great as that of former time. It is very true, that, to produce such remarkable fertility, Dr. Bland has not only marled well the whole surface, but has supplied putrescent manure very liberally to all the extensive galled surface. But it is scarcely necessary to add, what every practical cultivator knows, that such manure, in any quantity, without the marl, would have served but little purpose for producing and fixing fertility on naked galls, and certainly would have yielded no profit on the outlay.

I will here adduce a few other cases of marling improvements, which have been too recent to furnish such evidences of value and profit as are sought to be obtained by the queries, which are addressed to the conductors of older labors. But, even without waiting for the effects, the facts and circumstances alone of these late and zealous labors serve to place beyond all question the present general estimation of the value of marling in this region.

The farm called High Peak, also termed in derision Poverty Hill, and well known by, and well deserving that name, was formerly and long the residence of a wealthy planter (Col. Peter Epes,) who certainly would have improved it, if industry and any then known means could have availed. After his death, and the removal of his successor, the place was rented out, until no tenant could be found who would even fence a field for its possession; and then the land was left idle, and became grazing common for the neighborhood for some

years more. For a long time it had been in market, but had attracted no buyer. At last, and solely on account of its marl beds, in 1838 it was bought by Mr. Daniel Eppes, (a young man recently of age,) at \$4 an acre. By this time nearly all the old fields had grown up in young pines, and required labor in clearing greater than that of marling, and in advance of the latter operation. Still, though thus retarded, the marling, which was commenced, in the summer of 1838, had by last spring extended over 120 acres. The force employed for these preparatory operations, as well as for cultivating the land as fast as cleared and marled, was 7 and sometimes only 6 hands, 3 horses, and with the partial aid of 4 oxen.

It should be observed that very few persons have kept any regular and constant marling force, and that the operation ceases on almost every farm from March until in August. None in the neighborhood have yet (August 11th) recommenced this labor, though it is about to be begun on every farm not yet marled over.

But these and other such industrious exertions of very young men, even in this formerly indolent, careless, and wasteful neighborhood, are not so remarkable as the new-born energy of some others, well stricken in years, and in whom age might be supposed to have chilled the warmth of blood which urges younger men to enterprise, and to new and untried courses. The individuals who will next be mentioned, are near neighbors to each other, and are all old men, though among the youngest marlers in the county. Their location is not within the boundaries of the district to which the previous observations have been confined, though close adjacent, on the nearest lands which drain into Blackwater swamp. Marl was not known to be there available until just before the commencement of its use in the several cases that will now be briefly stated.

The Rev. Thomas B. Bryant, the youngest of these individuals, is 62 years of age. In the autumn of 1836, marl was first found on his land, by boring. He got out enough marl for 15 acres, in time for his next year's crop of corn, and since has increased the space marled to about 200 acres. He has also applied litter raked up in the woods to most of the poorest marled land; and the results,

altogether, are already such as to be entirely satisfactory. He is proceeding with zeal and energy.

Mr. Bryant's next neighbor, Mr. Francis Eppes, now 67 years' old, encouraged by his example, also bored for marl, and first found it last September. He went straight to work; and, late as it was, and small as was his working force, he marled 40 acres before planting his now growing crop of corn. The marl was within 3 feet of the surface, and very near and convenient to the field. The demands of his planting and tillage left no labor to spare for marling; but the crop labors being now finished, he is just about to recommence marling for another year's operations.

Mr. Jesse Heath is now between 70 and 80 years old, but hale and hearty as is deserved for the latter end of a life of industry, temperance and good conduct. Before he had hoped to find marl nearer, he was so anxious to use it, as the only means to have a clover lot, that he had hauled about 100 bushels 10 miles, from James River. He told me that he thought this great labor could be afforded for the benefit he derived. But considering it cheaper to buy and haul oyster shells from Petersburg, also 10 miles distant, as return loads, when he sent wood to market, he substituted that mode of supply, until he had obtained and used 26 hogsheds. He has found, however, the lime, though very beneficial, less so than the marl. This operation was stopped by his finding marl on a distant part of his land, by boring, after searching at various times for more than a year. He has to haul the marl two miles to his fields. This is the fourth year since his discovery, and he has marled 100 acres, and is proceeding with unabated zeal.

Mr. John Hite, also between 70 and 80 years old, having no marl of his own, began to marl a part of his land from a neighbor's pit at about 2 miles distance. He did not cover much extent of surface; but even his commencing so heavy a job, upon his observation of the effects obtained by his neighbors, is, like their more extensive and still continued operations, strong proof of the profits being manifest and unquestionable. It is proper to add that the three last named and oldest of these individuals have but scanty means, and would certainly put nothing at risk in experiments, or new practices of doubtful results.

QUERIES TO ASCERTAIN THE ACTION AND EFFECTS OF SHELL MARL AS MANURE, AND ANSWERS AS TO THE OLDEST MARLED DISTRICT IN PRINCE GEORGE COUNTY, VA.*

1. When was the use of marl as manure commenced on your farm?
2. Whose property was the farm, and under whose direction was its general management, (if not your own,) then, and since?

* Within the last few weeks, the reporter visited all the farms concerning which information of recent date will be given below, and submitted the queries to their several proprietors, and obtained and wrote down their answers; which answers were by them afterwards examined, corrected where deemed necessary, and finally approved. In each case, with the queries, a copy of the 'Essay on Calcareous Manures' was presented, for the purpose of enabling all to reply, with full understanding, on the subject of the 23d query; and the several answers to this last query were not taken at first, with the others, but only after time had been afforded for the deliberate reading and consideration of the pages referred to, and which are republished at a preceding page, (481.) for general reference. Such a mode of personal examination was by no means necessary; but it was resorted to in this case, both because published queries had been formerly tried in vain, and because, in the first beginning of this investigation, the explanations of the reporter might be needed, to make clear his own

3. What was the quantity of cleared land on the farm then ready for and subjected in its turn to cultivation of any kind, exclusive of all waste ground?
4. What is the quantity since added, by new clearings of forest land, or other waste spots brought into tillage? And, generally, was the land thus added richer or poorer than the present average quality of the farm?
5. What was the rate of progress in extending the marling—and, altogether, how many acres have been now marled?
6. What was the usual strength of the marl used, or its proportion per cent. of carbonate of lime, or pure shelly matter?
7. Was there any peculiar quality or ingredient, besides the carbonate of lime, that served to give additional value to the manure—as “green sand,” or gypsum, or a large proportion of fine clay, &c.?
8. Or was there any thing that served more than usually to lessen the value, as stony hardness of many shells, or of masses of marl, &c.?
9. What have been the usual quantities of marl applied to the acre?
10. Have there been made trials of any *much lighter dressings* of marl than the usual quantities—and if so, what were the results, compared to the usual quantities?
11. Have there been made trials of any *much heavier dressings* than the usual quantities—and with what comparative results?
12. Was the cropping and general management of the land, for a few years immediately previous to its being marled, such as might be considered *meliorating* or *improving*, (or at least as *preserving* its degree of fertility,) or was it *impoverishing*, and wasting of fertility in general? State the rotation of crops, if known.
13. The same question as to the few years immediately after marling, and since.
14. What have been the usual and general results of the applications of marl, on the increase of the crop next following, on land in different conditions—and afterwards to the present time?
15. Have the earliest fertilizing effects of marl (or the increased product of the first crop, or first course of crops in the rotation,) been subsequently increased or diminished by lapse of time—and in either case, under, and in proportion to, what circumstances?
16. Is it your opinion, whether founded on experience or observation, that the early increased product of your marled land (say for the first three or four crops, or of any number you have yet made thereon,) will be subsequently diminished, under any rotation of crops, or course of cultivation, that would not have been decidedly exhausting and injurious to the land, if marl had not been applied?
17. Has sterility, or other damage, been caused on any part of the land, by applying marl too heavily, or in any other manner—and under what circumstances of soil, tillage, &c.?
18. Has it been found that any other manures, either vegetable and putrescent, or mineral, are more efficacious, or durable, on poor natural soils *after* marling them?
19. What do you suppose was the average productive power, in corn, per acre, of all your now arable and cultivated land, before marling?
20. What do you suppose is the present average productive power of the same in corn?
21. What was the usual or average quantity of the crops of wheat made annually on the farm before marling, and recently?

meaning, in queries which perhaps previously had been too obscurely stated; and which queries, after being thus tested by some trial, have been in part recast, and made more comprehensive, as well as more precise and clear, than in their first form. The several answers were given, (and, as above stated, the purport written down as soon as expressed,) by each individual, without his knowing what any other had answered; except in one instance of joint operations in marling, and also in regard to the reporter's own answers, which were prepared after his being in possession of most of the others. Therefore, there was nothing of the opinions or facts of others furnished to serve either to guide or to test and correct any one's estimate or supposition of amounts and values. This, together with the circumstance that quantities and values are almost always stated upon mere supposition and by guess, and without any aid of previously written statements of precise measurements, will serve satisfactorily to account for much diversity in the estimates of products and values. But such diversity, under the circumstances stated, instead of impairing the value of the testimony, would strengthen it, in regard to the good faith of the witnesses, and their intention to furnish correct answers, in the mind of any judicious reader who might not know the other good and sufficient claims of these highly respectable individuals to entire confidence on that score.—Ed.

22. Taking such general grounds for the estimate as may be satisfactory to your own judgment, state what you suppose to be the annual value of the present *general or average gross product* of grain, or other marketable products of the fields in cultivation, of the land marled, caused by, and owing to marling—per acre, and also in total amount annually from the whole farm?

23. Does your experience or observation serve to contradict any of the important theoretical opinions in regard to the action of marl, or statements of actual results in practice, as presented in the "recapitulation" embraced in pages 53 to 56 of 'Essay on Calcareous Manures'—and if so contradicting, in what particulars?

I. Answers to the foregoing queries, by James B. Cocke, of Bonaccord.

Answer to query 1st.—In 1820 or '21, as a regular business. A small experiment had been made by my grandfather, James Cocke, and all knowledge of it forgotten many years before.*

* This very old experiment, made nearly or quite seventy years ago, and deemed a failure and forgotten until within the last twenty, was stated as below, at page 89 of 'Essay on Calcareous Manures.' Within the last few weeks the reporter revisited this spot, and saw that it still exhibited a decided superiority over all the immediately surrounding land, which, with the farm generally, had been marled, and all very much enriched, since the first published account of this curious and valuable fact.—Ed.

"The two old experiments described at page 36, though the only applications of fossil shells known to me, previous to the commencement of my use of this manure, were not all which had been made, and which being deemed failures, had been abandoned and forgotten. Another, within a few miles of my residence, was brought to light and notice afterwards, by an old negro, who was perhaps the only person then living who had any knowledge of facts. After I had found enough success in using this manure to attract to it some attention, Mr. Thomas Cocke of Aberdeen was one of those who began, but still with doubt and hesitation, to use marl to some considerable extent. One of his early applications was to the garden. The old gardener opposed this, and told his master that he knew "the stuff was good for nothing, because when he was a boy, his old master (Mr. Cocke's father) had used some at Bonaccord, and it had never done the least good." Being asked whether he could show the spot where this trial had been made, he answered that he could easily, as he drove the cart which carried out the marl. The place was immediately sought. It was on the most elevated part of a very poor field, which had been cleared and exhausted fully a century before. The marled space (a square of about half an acre) though still poor, was at least twice as productive as the surrounding land, though a slight manuring from the farmyard had been applied a few years before to the surrounding land, and omitted on this spot, which was supposed to have been, from its appearance, the site of some former dwelling house, of which every evidence had disappeared except the permanent improvement of the soil usual from that cause. A close examination showed some fragments of the hardest shells, so as to prove that the old man had not mistaken the spot. This, like other early applications, had been made on a spot too poor for marl to show but very small early effects; and as only one kind of operation of any manure was then thought of, (that which dung produces,) it is not strange that both the master and servant should have agreed in the opinion that the application was useless, and have remained under that opinion until almost all remembrance of the experiment had been lost."

2d.—My elder brother, Thomas P. Cocke, until his death, in 1832. Since, my property, and under my direction.

3d.—450 acres.

4th.—250 acres—much poorer.

5th.—To 1830, there had been about 175 acres marled; since, as much more as make 575 acres in all; which is all the arable and cultivated high-land except about 100 acres.

6th.—About 45 per cent. as a general average. Some of it much richer.

7th.—None known or suspected.

8th.—None, except more than usual of large lumps of coral.

9th.—About 230 before 1832. Since, 350 usually.

10th and 11th.—None.

12th.—The three-shift rotation, 1 corn, 2 wheat on best parts only, and 3 rest, without grazing. Considered as preservative of fertility, if not actually improving.

13th.—The same rotation continued, with clover more recently; until within a few years, when changed to the four-shift rotation, with two grain crops and two years' rest under clover. But little grazing allowed.

14th.—About 100 per cent. on first crop; and continuing to increase more afterwards.

15th.—Increased invariably. Of the oldest marlings, the present increased product from twice to three times as great as stated above of the first crop.

16th.—I believe the improvement already made to be permanent, and never will be diminished under the present or any cultivation not more exhausting.

17th.—No damage, except by being "marl-burnt," and that only in small spots, where too heavily dressed for the circumstances of the land. This disease only produced on acid, poor, sandy or gravelly soils, and by too much marl for such ground.

18th.—Vegetable or other putrescent manures believed to be more efficacious, and certainly much more durable. Have not tried any other mineral manure after marl.

19th.—Excluding the low-grounds (now 30 acres) which have never been marled, the average product in corn supposed to have been 7 bushels the acre.

20th.—27 bushels, on the marled land.

21st.—150 to 200 bushels, on each shift of whole farm, including the low-grounds (then 50 acres, some having since been sold.) No high-land formerly brought wheat, except the manured and enriched lot land around the houses. Recently the crops from 600 to 900 bushels.

22d.—Not quite \$10 the acre on the land under

grain and tobacco. The annual increased product of the farm about \$8000.*

23d.—Nothing to contradict; and the "recapitulation" confirmed by my experience so far as it extends.

II. Answers by John B. Bland, of Fountains.

Answer to query 1st.—In 1826.

2d.—My own, then and since, except a small part added by later purchase.

3d.—About 150 acres.

4th.—250 acres added, making 400 acres in all. The land added much poorer than the present average quality.

5th.—In 1826, my first year of possession, marled 30 acres, and by winter of 1836-7 had finished about 350 acres, which was nearly all the land then open, and all that was easily reached, and deemed profitable to marl. Since, only new clearings marled, 26 acres, making 376 acres in all marled.

6th.—One kind from 25 to 30 per cent. Another, which was used more largely, and for all the ridge land and new clearings, is 26 per cent.†

7th and 8th.—None.

9th.—300 bushels. On new-ground 400.

10th and 11th.—None.

12th.—Exhausting, having been rented out, severely cropped, and no regard paid to preserving its value.

13th.—Improving—being the three-shift rotation, with clover, and without grazing or mowing any clover.

14th.—An increase of from nearly to quite 100 per cent. of first crop, on most of the land. Less per cent. on the poorest—say such as produced before but 5 bushels of corn to the acre. And on these poorest parts, the after increase also is less than on better land.

15th.—Increased invariably on my land, except on marl-burnt spots; and these were not considerable, and were easily cured by applying there putrescent manure. On another farm, then

* It was deemed preferable to inquire as to increase of gross products, instead of the increase of net products from marling, because of the greater uncertainty of the calculation as to the latter. But all the witnesses agreed in this opinion, that one-fourth of the gross product of grain and other marketable crops, together with all the increase of offal, would fully compensate, and generally more than compensate, for the increased labor of cultivation &c. caused by marling. Therefore, of the amount of gross products stated above, and elsewhere, three-fourths at least were deemed by all the witnesses to be net product; which would be the return and profit for the digging and laying on the marl, which of course are not counted in the increased expenses of cultivation, handling, and carriage of crops.—Ed.

† The first kind of marl is that of the "broken river banks," of which a part stretches far into this tract. The other kind was considered by Mr. Bland as very superior in appearance and quality, and had been supposed to be much richer than was found, (as stated above,) from analyzing a specimen which he furnished for that purpose.—Ed.

my residence, and then and until recently held as rented land, 17 years ago, I marled a piece of old tobacco lot land, of good soil, and before marling, as rich, from frequent manuring, as it well could be. This land has borne a grain crop every year since, without any more help. There was but little increase of crop seen at first from the marling, and the land is now reduced very much below its then and previous rate of product.

16th.—No such diminution in any future time, expected or feared.

17th.—Not except the marl-burning as before stated. That produced only on the poorest, and naturally poor land.

18th.—No other mineral manure tried. Putrescent manure much more durable after marling. Not sure that it is more efficacious for first crop.

19th.—Ten bushels.

20th.—Thirty bushels.

21st.—About 4 bushels to the acre before marling, and from 8 to 10 at this time after corn. No following for wheat.

22d.—\$6 66 per acre on all land in grain, and \$1800 annually on the whole marled land of the farm.

23d.—No contradiction to the "recapitulation."

III. Answers of Edward A. Marks, of Burley.

Answer to query 1st.—In 1827, except a few acres marled here by my father in 1820, that being his first experiment.

2d.—Mine.

3d.—170 acres.

4th.—100 acres, of which 40 was richer, and 60 much poorer; and the general average poorer than the whole farm now.

5th.—From 1827 to 1830, about 50 acres, and since, 180 or in all about 230 acres, all of which was done by 1836. Since, other employment (cutting timber for market) has prevented my continuing marling; but it is now just about to be resumed, and the balance of the land will soon be marled.

6th.—Not known—but the marl was generally strong.

7th.—None.

8th.—Nothing unusual, except as to the marl from one pit, which covered 15 acres, and which was very hard, and many of the lumps still remain on the field.

9th.—Up to 1830, the quantity intended to be applied was 400 bushels, and since, 300; but both these desired quantities were often exceeded in the actual application.

10th.—None less than 300 bushels; but in some cases, on the more sandy land, where this quantity was applied of the poorest marl, the effects were better than from richer marl, or heavier dressings.

11th.—One piece of newly cleared wood-land marled 4 years ago at 800 bushels to the acre, is now less improved than adjoining and similar land marled with half the quantity.

12th.—About half the land now cultivated has been gradually cleared since 1827, of its original forest growth. The other half had been long cleared, and under the three-shift rotation,

with no grazing; but no manure, as all the offal of crops was carried to the then homestead on the adjoining Old Town farm. This system supposed to have been preservative, but not improving.

- 13th.—The same three-shift rotation continued, until 4 years ago, when changed to the four-shift, with 2 grain crops in 4 years on the inferior land, and 3 in 4 years on all the new and better land.* This last found to be too severe, and shall return to the former three-shift course.
- 14th.—On the old land, 100 per cent., except where galled, and there very little early increase. On the new-ground, all marled before its first crop, and therefore cannot state the earliest increased product. Now, supposed 150 per cent. on the old, and full as much improvement on the new land, over what might have been its early product without marling.
- 15th.—Increased—in all cases except on spots marl-burnt, by excessively heavy dressings. This injury the greatest on very light and poor, or galled land.
- 16th.—No subsequent diminution expected.
- 17th.—None, except as before stated on the small extent of marl-burnt spots. A small piece of before very poor and exhausted land, on a neighbor's farm, which was marled from my pit 13 years ago, at fully 800 bushels to the acre, after its first succeeding crop was made, and to this time, has continued perfectly barren.
- 18th.—Vegetable or other putrescent manures certainly more efficacious at first, and the effects more lasting. Believe that one load of any such manure on marled land is fully worth as much as two on similar land not marled. Have tried no other mineral manure.
- 19th.—10 bushels to the acre.
- 20th.—From 22 to 23 bushels.
- 21st.—Formerly, 121 bushels—that having been the actual average of three successive crops. Since, and recently, about 500 bushels the average crop of wheat.
- 22d.—Suppose the average gross increased product to be \$6.66 the acre for the grain, tobacco, &c., of each crop, and \$1020 of annual increase on the whole marled land.
- 23d.—Nothing contradicting any part of the "recapitulation," in my experience or observation.

IV. Answers of John H. Marks, in regard to Old Town farm.

- Answer to query 1st.—In 1827, except 10 to 15 acres marled about 1820.
- 2d.—My father's, until his death in 1822—then under direction of my brother Edward A. Marks, until in 1833, and since in my possession. Until 1833, this farm and Burley kept together, and the same general management as to marling.
- 3d.—400 acres.
- 4th.—50 acres; poorer than the present general average; 65 acres of the fields not cultivated for

* This is the four-shift rotation as pursued at Shirley and Westover, of, 1st year, wheat on clover. 2d, corn, 3d, wheat, and 4th clover left untouched, to be ploughed under in autumn for next crop of wheat.—Ed.

8 years before being marled, because of the great poverty.

- 5th.—From 1827 to 1840, about 288 acres; 300 in all.
- 6th.—Same pits used as for Burley, and same answer—as also to 7th and 8th queries.
- 9th.—Before 1833, 400 bushels; since, 300.
- 10th. and 11th.—None observed.
- 12th.—The three-shift rotation with close grazing; of course impoverishing.
- 13th.—The like treatment until 1833; since, 4 shifts, and 3 grain crops in 4 years on nearly half the land. No grazing, and clover sown generally.
- 14th.—Suppose 80 per cent. Something better now.
- 15th.—The small subsequent and additional increase is general.
- 16th.—No such diminution expected to occur.
- 17th.—Only by marl-burning, and that in poorest spots.
- 18th.—Yes, both, and under all circumstances. Would not put manure on the land not marled.
- 19th.—About 10 bushels, except on 40 acres of lots, which had been kept highly manured for tobacco, when that crop was formerly made, and which would have brought 30 bushels of corn to the acre before being marled.
- 20th.—About 25 bushels average.
- 21st.—350 bushels before marling—700 now.
- 22d.—Estimated at same rate as on the Burley farm—\$6.66 the acre, and about \$2000 annually for the whole marled land.
- 23d.—Nothing known which contradicts or opposes the statements in the "recapitulation" referred to.

V. Answers by Lt. Harrison H. Cocke, U. S. N., in regard to Evergreen farm.*

- Answer to query 1st.—About 1827.
- 2d.—The farm then the property of Mrs. Rebecca Woodlief, and the entire management under overseers. Since 1830, under my direction, and more recently, I became the exclusive proprietor.
- [3d and 4th queries not in the first draught sent to the writer, and therefore not answered. The same remark will apply to other queries which will have no answers.—Ed.]
- 5th.—Previous to 1830 there had been only 60 to 70 acres marled. Afterwards, and up to the present time [January, 1839,] there must be between 500 and 600 acres more marled.
- 6th.—It varied in strength from 25 to 60 per cent. of pure shelly matter.
- 7th and 8th.—Nothing more than usual.
- 9th.—From 200 to 300 bushels the acre; the greater quantities being given in proportion to the then greater productive power and stiffer texture of the land.
- 10th.—None.
- 11th.—Only as heavy as 400 bushels, on poor stiff and moist land, and with much increased advantage in the results. But, with such heavier dressings. I applied, at the same time, a good

* The paper of which these answers are an abstract and abridgment, was written at and sent from Pensacola, January, 1839, where the writer had not the means of reference to any written memoranda on the subject.—Ed.

covering of pine leaves and other litter raked up in the woods.

12th.—Impoverishing considerably—having been long under the three-shift and close grazing system, with very careless and bad tillage.

13th.—Same exhausting course to 1830. Since, the three-shift system without grazing, and deep ploughing first introduced.

14th.—The increase of previous products, on the first crop after marling, has always been considerable, and sometimes has been as much as 100 per cent. The subsequent increase not so perceptible; but the continued and gradual melioration of the soil very evident. The greatest improvement generally found on stiff red clay soil.

15th.—Increased; but, as stated above, gradually, and the improvement never very marked at any one time after the first crop.

16th.—No such subsequent decrease expected.

17th.—No case of sterility produced.

18th.—It is my opinion that all vegetable or putrescent manures are much more efficacious after marling than before, on poor natural soils. Have used no other mineral manure after marling except the gypseous and green-sand earth from the bank on this farm, which has been tried at the rate of 30 bushels to the acre, and with marked beneficial results, particularly on the growth of clover and other grasses.*

[19th to 21st queries were not among those first submitted, and therefore are not answered.]

22d.—I suppose that the net product caused by marling, under a proper corresponding system of cultivation, is 50 per cent. per annum.

23d.—Not having read the work for several years, and not having it now to refer to, I can only say that according to my recollection there was nothing known which served to contradict any of its important positions, or statements of practical effects.

VI. Answers of Elgin Russell.

Answer to query 1st.—In 1827.

2d.—Mine.

3d.—Only 30 acres of poor high-land, and 20 acres of low-ground.

4th.—142 acres; poorer than the present average.

5th.—1827 to 1820, about 20 acres, and since 130, making 150 in all.

6th.—Varying from 25 to 50 per cent. in different diggings.†

* This body of "green sand," or of "gypseous earth," as I termed it, in my ignorance of geology, is on the river, just below the mouth of Bailey's Creek. It is the richest known of all this district, and was the first discovered by myself, in 1817. See my account of the "Gypseous Earth of James River," at page 207, vol. i. of Farmers' Register.

† Part of Mr. Russell's marl is that of the "broken banks," a valley of which extends into his land. This, as elsewhere, lies over a greenish earth, containing green-sand, and not any carbonate of lime; and this under-stratum he dug up and used indiscriminately with the marl above, at first, as stated in the next answer.—ED.

7th and 8th.—None known. But the green earth which lies under the shells, in some of the pits, was at first used to considerable extent, with the marl above. I perceived no difference of effect, either beneficial or injurious, or less effect, from this mixture. This green earth was not any where applied entirely separate, so as to show whether it had any effect, or differed in effect from the marl.

9th.—200 bushels to the acre, except on new-ground just cleared, where 400 bushels were given.

10th and 11th.—None other than stated in the preceding answer.

12th and 13th.—Hard worked and cruelly used, both before and after marling, owing to my not having enough land open for cultivation to permit any to have rest. The relief afforded by the three-shift rotation (one year of rest in three,) begun to be afforded within the few last years only.

14th.—The usual increase of next crop after marling, about 100 per cent. on old land producing previously from 5 to 10 bushels of corn to the acre. On new and richer land only 30 to 35 per cent. A gradual increase on both since.

15th.—Increased, but less visibly than in the earliest effects.

16th.—No such diminution expected under the circumstances stated in the query.

17th.—No damage, or reduction of product, except on the most miserable poor spots of ground, where the marl was put too heavily.

18th.—Believe that both vegetable and other putrescent manures are certainly more efficacious after marling; but whether more durable, I am unable to answer.

19th.—10 bushels.

20th.—20 bushels.

21st.—150 bushels before marling and 350 now.

22d.—Suppose the increased gross product in grain, or marketable crops, to be worth \$3 the acre on all the marled land—or \$426 annually on the farm.

23d.—No contradiction to the opinions and statements referred to.

VII. Answers of Theodorick Bland, of Jordan's Point.*

Answer to query 1st.—In 1830.

2d.—My own.

3d.—350 acres.

4th.—About 12 acres.

5th.—200 acres marled to this time.

6th.—50 to 60 per cent.

7th and 8th.—None known of either. When I first began to marl, I supposed (from incorrect information) that the greenish earth, which lies beneath, was marl, and the richest kind; and until better informed, I applied this earth in preference, and alone and very heavily. 15 acres were thus covered, at about 700 bushels to the

* These answers are confined to Dr. Bland's land, held in 1830 and since, and does not include the larger quantity of the original Jordan's Point land, which he held through this time as a tenant, and of which he has very lately become, by purchase, the holder in fee simple.—ED. F. R.

acre. No effect seen, good or bad. The same land after some years was also marled.

9th.—About 350 bushels.

10th and 11th.—None of either.

12th.—A scourging and exhausting course. The rotation was, corn, wheat, and close grazing; and, instead of the year of rest (or grazing,) sometimes another grain crop taken from the richer part of the land.

13th.—Improving; the rotation since, 1st corn, 2d wheat, 3d, clover preserved entirely from grazing and mowing.

14th.—On neutral soil, originally very rich and much reduced, the first increase supposed to be 30 per cent, but since more than 300 per cent. known by measurement of products before and since marling. On light and acid soil, first crop supposed to be increased 75 per cent., and now 400 per cent. on the productive power before marling.

15th.—Always increased.

16th.—No such diminution believed possible.

17th.—Only by marl-burning, from too heavy dressing on some very light and poor spots.

18th.—Both more efficacious and more durable.

19th.—About 20 bushels of corn on the best half, and 7 bushels on the worst half; or say 13½ bushels general average.

20th.—35 bushels.

21st.—The richer half of this land, about 115 acres net (the Point field,) alone brought wheat before marling; and on that, 800 bushels was considered a good crop. Recently, estimating the whole from the actual product of the part under wheat, the then and present productive power of the same land is estimated at 2500 bushels of wheat, to be made after corn.

22d.—\$9.50 the acre, for the land annually under tillage; and \$1100 annually for so much of the farm as is embraced in these answers.

23d.—No contradiction.

VIII. *Answers of Edmund Wilkins, of Springfield farm.*

1st.—In winter of 1834-5, except a few acres covered by the former occupant, some years earlier.

2d.—Mine. The land bought just before my beginning to marl.

3d.—263 acres.

4th.—170 acres, and much poorer than the rest of the farm, with the exception of about ten acres; which was good tobacco land when cleared.

5th.—214 acres marled since 1834.

6th.—About 42 per cent. The marl procured with great labor, at one extremity of the land, and much of it hauled a mile, and some of it one and a half miles.

7th and 8th.—None.

9th.—From 180 bushels on poorest, to 320 on best land.

10th and 11th.—None of either observed, or worth naming.

12th.—Impoverishing, and the land greatly impoverished.

13th.—The three-shift rotation, with very little grazing. Considered *preservative* of its existing fertility, if not improving.

14th.—On the poorest land, forming much the greater proportion of the farm, and, before mar-

ing, bringing about 5 bushels of corn to the acre, the increase of the first crop from 100 to 150 per cent. On much better natural land, and not very much reduced, the first increase not more than 30 or 40 per cent. Very little land yet has borne a second course of crops; but that little, on the second cultivation has shown an additional improved product of full 50 per cent more, upon the former poorest product.

15th.—Have not enough experience for my opinion to be worth more than was stated in the preceding answer.

16th.—No such diminution expected.

17th.—A few small spots only, very poor and sandy, or galled, have been marl-burnt.

18th.—Not assured that the first effects of putrescent manure is greater on marled land; but sure that it is more durable. No other mineral manure tried.

19th.—About 5 bushels of corn per acre.

20th.—About 15 bushels of corn to the acre.

21st.—About 3 bushels per acre, and at this time well produces 8 bushels per acre.

22d.—\$3.50 the acre on the cultivated land—and about \$736 on the whole 214 acres, counting all, whether under tillage or at rest.

23d.—Know nothing that opposes, or that does not fully agree with the statements and opinions given in the "recapitulation."

IX. *Answers to the queries by William Wilkins.*

Answer to query 1st.—In 1833, a few acres marled. In 1835 regular marling began.

2d.—My own.

3d.—60 acres.

4th.—40 acres, making 100 in all now open and cultivated.

5th.—About 70 acres marled to this time.

6th.—From 45 to 52 per cent. All hauled from the pits of other persons' adjacent farms.

7th and 8th.—None.

9th.—300 bushels.

10th and 11th.—None.

12th.—Exhausting.

13th.—Improving. Three-shift rotation, with clover, not grazed generally or mowed.

14th.—Product more than doubled the first crop after marling; and considerably more since. The greatest improvement by marling made on the pine old fields; the trees belted for bringing the land into cultivation.

15th.—Increased in all cases.

16th and 17th.—No.

18th.—Manure lasts longer.

19th.—From 5 to 7½ bushels of corn.

20th.—25 bushels.

21st.—A few acres only of old improved lot around the house formerly sown, which brought about 60 bushels of wheat. No regular and full wheat cropping as yet. Two of the shifts (of 33 acres each) supposed would bring 10 bushels to the acre. The other, too light, and too poor as yet, to be worth sowing in wheat.

22d and 23d.—Not answered.

X. *Answers to the queries, by Richard M. Harrison, of Huntington farm.*

Answer to query 1st.—In 1834.

2d.—My own.

- 3d.—About 200 acres.
 4th.—Nothing added.
 5th.—Marled about 20 acres a year. At this time, 120 to 130 covered.
 6th.—Not known.
 7th.—None.
 8th.—In a part of the marl, many hard masses, which however were mostly left at the pits.
 9th.—From 250 to 300 bushels of marl.
 10th and 11th.—No such trials.
 12th.—Impoverishing; the three-shift rotation.
 13th.—Improving.
 14th.—On first crop, about 50 per cent—and since about as much more.
 15th.—Increased in every case old enough to judge of.
 16th.—Think it never will.
 17th.—A little of the ground marl-burnt by too much being given.
 18th.—Yes, as to vegetable and putrescent manures.
 10th.—About 10 bushels.
 20th.—About 20 bushels.
 21st.—Before marling the annual crops of wheat were about 300 bushels. Since, they are about doubled.
 22d.—About \$3.50 per acre, to the land under grain annually; and \$466 annually on the whole farm.
 23d.—No contradiction, so far as my short experience extends.

XI. *Answers by Edmund Ruffin, in regard to Coggins' Point farm.*

Answer to query 1st.—On Coggins' Point farm, on James river, in January, 1818.

- 2d.—My own property, and under my personal direction from 1813 to 1832; afterwards under my overseers, until 1839, and since in possession and charge of my son, Edmund Ruffin, Jr.
 3d.—In 1818, about 540 acres, of which 68 had been cleared since 1813.
 4th.—About 197 acres added, principally by new clearings, making 737 of tilled land now. Nearly every new acre added since 1813 was poorer than the present general average, and without exception as to the clearings since 1817. The average quality of all the new land was poorer than the present general average of the whole farm, by nearly one half.
 5th.—In 1818 marled 15 acres.
- | | |
|------|-----|
| 1819 | 62 |
| 1820 | 25 |
| 1821 | 80 |
| 1822 | 93 |
| 1823 | 100 |
| 1824 | 80 |
- when nearly all the then open land which was supposed to need marl had been covered. By 1830, the marled surface had been increased to 670 acres of cultivated land, and since, to 51 acres more, of pasture and wood-land not cleared.
 6th.—Most of the marl used contained from 37 to 40 per cent. of shells, or carbonate of lime. Another kind averaged about 45 per cent. Another, (the marl of the broken river banks,) used perhaps for 100 acres, had from 20 to 25 per cent., the remainder of its contents being coarse sand. The bed of peculiar appearance,

and greatest strength, under the north end of the peninsula, contains 61 per cent. This, being distant, was used for about 60 acres only.

- 7th.—None, except the last-named in last answer. This contains also a very small proportion of gypsum, some "green-sand," and a very small proportion of some soluble saline matter.
 8th.—Only the usual degree of hardness of the shells, and the proportion of earth not calcareous being, as usual, principally of silicious sand.
 9th.—For first three years, generally 500 to 600 bushels. Afterwards 300 to 400.
 10th.—As little as 96 bushels have been used. The early effects much less than of larger quantities. This and other light dressings being deemed quite too small, were added to, in a few years, so as to be made equal to what was then supposed a proper and sufficient rate.
 11th.—As much as 1200 bushels were tried, and without injury, or perceptible greater early benefit than 600 produced on adjacent ground. This land then newly cleared, and since also well manured from the barn-yard. The lighter marlings, say from 3 to 400 bushels, as productive on the second round of crops, if not on the first, and more profitable than any heavier—except where much vegetable matter was also given to the ground, then or afterwards; in which case, more marl was required, and in proportion; and was used profitably, if given heavily at first.
 12th.—The four-shift rotation (1st, corn, 2d, wheat, where not too poor to bring it, and 3d and 4th, the natural grass and weeds, not grazed,) had been pursued since 1814; and this very lenient rotation was barely enough improving to compensate for the injury caused by washing, the land being generally hilly.
 13th.—The same rotation continued after marling, and then it became decidedly improving. Some years afterwards, clover sown on all wheat. For the last 10 years, the course of cropping has been more severe (by taking an additional wheat crop on the best land under clover, or in the second year of rest,) and also partial grazing permitted. Still, the system of cultivation is improving to the land, though less so than before, when milder.
 14th.—On newly cleared poor and acid land, but full of rotten vegetable matter, and in its best state for producing, the increase from marling on first crop about 50 per cent or more. On old and previously much exhausted land, the first increase from 80 to 120—and in some cases more than 150 per cent. On the same lands, now, 10 to 20 years after marling, the increase upon the original product is from 200 to 400 per cent. and generally fully double the earliest increased crop, next after the marling. On poor stiff soil, the increase and profit of marling less than on poor light soils. On neutral soil, naturally rich, but impoverished, the early increase much smaller, but growing with time. On calcareous land, no benefit.
 15th.—Increased always, when of any benefit at first, except where much "marl-burning" was caused by the dressing having been too heavy.
 16th.—No general diminution expected, and none believed to be possible, under a mild and judicious rotation of crops.
 17th.—Only as above stated, from marling too

heavily; and that was the more readily produced, (when the marling was alike,) in proportion to the poverty of the land and the severity of its tillage. The disease of "marl-burning" prevented or removed by giving vegetable matter in proportion to the excess of marl. A large space has been thus diseased; but by rest, and vegetable matter, the injury has been almost every where cured, or prevented.

18th.—Putrescent manures believed to be more efficacious at first, and certainly more lasting in effect, and far more profitable, on marled land. Gypsum, and also "green-sand" generally having more or less effect on clover after marling, on acid land, and *always* quite inoperative there before marling.

19th.—Certainly not exceeding 12 bushels; I incline to think not more than 10. All cleared since 1818 was marled before being cultivated.

20th.—From 25 to 27 bushels per acre. The largest crop yet made was in 1839, amounting to 4500 bushels. Of this crop one entire field of 112 acres which had been all originally of poor and mean soil, and all, both new and old land, quite poor when marled, was supposed to have averaged 30 bushels to the acre.

21st.—The general average of my six first years' crops, immediately preceding marling, was 637 bushels. The average product per acre, in the first three years, was 5½ bushels, on the richest half of the land—wheat not being sown on the poorest half. The greatest crop made before marling was 896 bushels. The greatest since, in 1831, was 2500. This year, (a very short crop here and generally) the quantity made was nearly 2000 bushels. Allowing for the recurrence of all the usual measure of diseases and disasters to which this latterly very precarious crop has been subject, the actual average annual product of wheat is estimated at 1800 bushels. This is believed to be greatly below the productive power of the several shifts. The causes of usual and greatly reduced product are principally the ravages of insects.

22d.—I suppose \$8 per acre, on all the land each year under marketable crops; and for the quantity of land usually under tillage, about \$3200.*

23d.—No answer requisite, from this source.

Concluding General Remarks, on the Queries and Answers.

It will scarcely be necessary, for the benefit of observant readers, and might be deemed obtrusive, to sum up and compare the evidence presented in all the foregoing answers. Therefore, without noticing any which present opposing or disputed opinions or facts, it will merely be here stated that

* This is estimated on the supposition of the increase of corn per acre being worth \$10, of wheat \$6, and that rather more than half the land is under these crops; or, if more, that this product at least is obtained. Their offal and the clover are not estimated as market crops, but considered merely as sources of manure and improvement. All the long continued effects of putrescent manures, and all the benefits of clover as manure, are counted as due to marling, as there would be neither of these benefits existing without having marled.

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all the witnesses concur in maintaining the following positions:

1st. That every application of marl made by them has produced immediate and considerable benefit; and that the benefit has afterwards increased with the lapse of time, under all ordinary circumstances, and any cultivation which was not very injudicious, and manifestly destructive.

2d. That the marling operations of every individual named, on his own testimony, (and judging from their continuation and extent, still more than from opinions stated of particular results,) have been highly profitable.

3d. That marl, in all this district at least, has been found to be a certain and great enricher of naturally inferior and poor soils.

4th. That vegetable and other putrescent manures are much more serviceable and profitable on marled lands.

5th. That the beneficial effects of marling are not transient, but permanent; and no future abatement of the early improvement is counted on, or supposed possible, under a proper system of tillage.

6th. That a large increase of annual income, and consequently of general value of the land, has occurred in every case of extensive marling.

7th. That experience and observation, so far as extended, serve to sustain, and in no case to contradict, the more detailed views, and numerous statements of facts, or of opinions, which are referred to and embraced in the concluding query.

From the Carolina Planter.

BOYS, AND THEIR CURE.

In the History of the Horse, pp. 159-60, this disease is treated with apparent disregard, and the compilers of the work give only the experience and knowledge of Mr. Bracy Clark on this subject. That he knew nothing of the danger of bots, (the larvæ of the *Cestrus equi*), is very evident, and his profound ignorance could not have come within the knowledge of the compilers, else they would not have admitted his opinion in a work of such general circulation, and in other matters relative to the horse, of such utility as the work above quoted. He advances the idea that the gad fly merely takes advantage of the internal structure of the horse to perpetuate its species—that it is *not the enemy* of the horse, and therefore *not injurious*—and that in due course of nature it will free itself from its prison birth-place. The first assertion I admit. The object of this article is to expose the fallacy of the second—and with him I agree in the latter, provided the constitution of the animal is sufficiently strong to bear up against the ravages of this truly carnivorous destroyer. Yet I shall attempt, and I hope satisfactorily, to show that many valuable animals are annually sacrificed to ignorance and the too frequent consultation and credence given to this book on this subject. Mr. Clark's doctrine is, that the bots are fastened to the cuticular and insensible coat of the stomach, and that therefore they are unapproachable by medicines. Actual experience and observations have shown to me, that in the early stages of the life of the larvæ they feed on the delicate mucus of the stomach—yet I have examined horses whose stomachs were perforated not only through the cuticular,

but through the outer coat, so that the half digested contents of the stomach escaped into the hollow of the chest—which was the work of the larvæ—for there was not that appearance of decay which would denote such inflammation as would cause rottenness of the stomach; and the raw edges of the orifices plainly indicated that the stomach had been gnawed through by the grub.

I am convinced that as soon as the horse becomes feverish, and when that food which is most congenial to the appetite of the larvæ is diminished by the heat of inflammation, they attack the stomach, and from their carnivorous nature are soon enabled to pierce it entirely through, which causes instantaneous death. It has been argued that their "heads being covered by the mucus and cuticular coats of the stomach to which they are attached, they cannot be affected by any medicines which may be administered with safety to the horse." I acknowledge that such medicines as brine, oils, and spirits of turpentine, will never cause them to detach—and it is reasonable to suppose that these will have no effect, as the larvæ will live in the first 48 hours; in oils, 15 hours; in spirits of turpentine, 3½ hours, and even in nitric acid, 37 minutes.

The larvæ is carnivorous, and created to be the scourge of the horse during that period which nature has ordained they should abide in the stomach. Such horses as are kept stabled are very seldom liable to inconvenience from them: and in every instance we find that horses which have been, at some time previous, grazing or running at large, are the victims. This is owing, I presume, to the fact that the urine of the stable prevents the œstrus equi from breeding when the larvæ is voided under its influence, and that greater numbers are bred in pastures, where the sun and the nature of the situation tend to facilitate their generation.

I have never found relief in any case of bots, unless the following remedy was administered, which was communicated to me by a gentleman of the west.

Two buttons of nux vomica, pulverized or rasped up, and a decoction made by boiling it in 1 pint of water, boiling it until the quantity is decreased to half a pint. Give the horse this, and repeat the dose until relieved, administering the doses at intervals of two hours. I have known, in one instance, seven doses to be given, and have never known the remedy to fail in a case of bots if taken in time.

This remedy will prove itself when it is considered that the bot is carnivorous and nux vomica is a sure poison to all carnivorous animals; whilst the horse being gramivorous, it cannot be of injury to him or animals of that species. After this being administered to a horse he will invariably thrive finely; which would suggest that it perhaps would be prudent for us to use this as a preventive, and therefore obviate the necessity of using it as a cure.

Newberry, S. C., July 16, 1840.

[The article referred to above, from the History of the Horse, and which maintains the opposite doctrine of the harmlessness of bots, was inserted at page 251 Vol. II. of Farmers' Register.—Ed. F. R.]

AGRICULTURE IN MASSACHUSETTS.

Morals of Labor.

From the New England Farmer.

Whoever had the pleasure of hearing Gov. Hill at the State House the last winter, at one of the agricultural meetings, will not have forgotten some admirable remarks made on that occasion by this gentleman. If we had access to them, we certainly should transcribe them, as embracing precisely our own opinions in relation to the subject. Our young men in general, when they go to service, or as it is customarily termed, "hire out," seem to think that there is something degrading in the idea of being servants; and bring with them so much of what they deem a proper spirit of independence, that they forget the employer has any rights, and take pride in insolence and ill-manners. Now we protest against meanness and servility, but still more against incivility and insolence. The truth is, that no honest employment is derogatory to any man; and we cannot name a man in the community who is not a servant in some respects to others. Many situations in life, which to the multitude are objects of envy, are situations of extreme drudgery, much more severe both to mind and body than labor on a farm.

The laborer has his rights and duties. Having entered into service for a fixed compensation, unless express exceptions are made at the time of the engagement, he is bound to render his best services on the farm, in the most assiduous and faithful manner, under the direction of his employer, whether he approves that direction or not; and we know of but one rule for an honest man, which is to consider his employer's interest as his own, and do in every respect in the case as he would judge it right to do if the situations were reversed, and he were the employer instead of the employed. The employer is bound on the other hand, to furnish the laborer with a sufficiency of good and wholesome food, suitably prepared; comfortable lodgings; exact no unreasonable service; and treat his laborers with kindness, civil language, and all proper confidence. This comprehends all the mutual duties as we understand them. It often happens that hired men are disposed to make difficulties if two tables are set. In this matter let the householder never yield a hair's breadth of his authority. In many cases it is most convenient to have but one table; but in this respect the laborer has no claims except to a sufficiency of good and wholesome food, prepared properly and seasonably; but he has no right nor shadow of right to interfere with the farmer's domestic arrangements, as oftentimes it must break up entirely that domestic quiet and privacy which constitute the chief pleasures of domestic life. We have no arbitrary distinctions of rank in this country, and every man's standing depends upon his moral character. One man is as honorable as another, who behaves himself as well as another. But then our pursuits in life are very different from each other. Our tastes are not always congenial; and it is not necessary, that under the ridiculous pretence of maintaining a nominal equality, we should sacrifice the comforts of life by associations which are not in truth agreeable to either party. Where it can be done without being offensive or inconvenient, we admit that it would be much more

economical and convenient to form but one family; but we maintain that this is entirely at the option of the employer, in respect to which the laborer has no demands whatever.

There is a matter which a few years since gave a great deal of trouble to farmers, which the wholesome decisions of the courts have materially corrected. Then laborers felt that their employers were in their power; and that they were at liberty to quit the service and demand their wages at their pleasure. Sometimes in the midst of planting, or haying, or harvesting, either through mere caprice, but most commonly with the expectation of getting higher wages, they would quit their employer and leave him under every disadvantage. The courts having decided that no man is entitled to his wages who, without good and sufficient cause, fails to continue his agreed term, the employer has a proper remedy in his own hands, which will keep this matter right.

There is another point in this case of the morals of labor, upon which we have not the power to animadvert with too much severity; and that is, a practice among employers of seducing by bribes or intrigues, or some vile means, a laborer from the service in which he is engaged. We have known this done so frequently, and under circumstances of such extreme inconvenience and loss to the injured party, that no words can express our sense of its baseness. It is a gross violation of all faith and honor; and a man who would directly or indirectly be guilty of such an act, ought to be pronounced an outlaw of civil society.

The matter of providing for laborers has become a very serious affair; and gross extravagance has come in here as into every other department of life. A hired man, when he demands sixteen dollars a month and his board, generally estimates his board as of no consideration. But in few parts of the state can a man be boarded for less than eight or ten dollars a month; and when the farmer perceives that instead, as the laborer pretends, he is paying only sixteen dollars a month, he is in fact paying twenty-six dollars a month, the burden becomes very heavy. Our habits of living have become too luxurious. The habit of five meals a day which prevails on many farms, is most pernicious to the health. We know well by experience that three meals a day, at 6 A. M., at 12 P. M. and at 6 P. M., with sometimes a cracker or two in the forenoon, is all that is essential or beneficial. Nothing is more unfavorable to health, both of body and mind, than by frequent eatings to keep the organs of digestion under continual exertion; and to attempt to labor with the stomach filled to repletion. The allowance formerly of a Scotch laborer in time of haying and harvesting, and no men ever labored harder or enjoyed in general firmer health, or were capable of going through greater hardships, was a peck of oatmeal on Monday morning, and a gallon of milk a day. This was the week's allowance, and he prepared it in any way which pleased him. The allowance of a field laborer at the south is one and a half peck of corn meal per week and three and a half pounds of pork or bacon, or two and a half pounds of pork and fourteen herring. With this they labor constantly from daylight to dark, with only an occasional hour allowed them some Saturday evening. Their health is good; and we were told by many of them that the supply was in general more than

they required. Water is their only drink. Now most certainly we do not refer to such cases as these with any desire that our laborers should be abridged of a single comfort; but as displaying the extremes to which our extravagance leads us; and to show how much less is required than we generally suppose, to maintain the vigor of the human frame, and to support men in health under the severest toil. We are satisfied that our present system of management is actually prejudicial to health and morals. How a remedy shall be found and applied, is more than we can say.

*The temperance reformation has been an immense gain both to employers and laborers. The very personification of evil, in our opinion, is rum; and the blessed change which even its imperfect progress has produced in the country, is every where apparent, and fills the benevolent bosom with inexpressible joy and the brightest hopes.

H. C.

TO PRESERVE CUCUMBERS FROM INSECTS.

From the Agriculturist.

In the spring season, as soon as the young plants show themselves above ground, place 20 or 30 cotton seeds close around each plant so as to touch it, and it is sure to escape all predatory bugs. The cotton seeds should not be removed till the vines begin to run. I give this statement upon the authority of Mrs. Tabitha Moore, consort of Capt. A. Moore of this county. She has followed the practice between 15 and 20 years with uniform success. Let the amateurs of the garden try it.

F. H. GORDON.

CHICORY.

From the Agriculturist.

Messrs. Editors:—The celebrated Arthur Young, during an agricultural tour in France, saw this plant there cultivated and used for soiling both cattle and horses; so highly did he esteem it, that he carried some back with him to England, and declared if he did nothing more than introduce the use of chicory among the farmers, he had fully discharged his duty to his king and country. The late General A. Jones, of North Carolina, from the high encomiums passed on it in the works of Mr. Young, was induced to import some of the seed. It was sown in drills—the product was immense, and all kinds of stock eat it voraciously, but it was found to be indigenous in Carolina; there was difficulty in the collection of the seed; he abandoned the cultivation, but always spoke highly of its yield and its qualities for soiling. It seems to be of the lettuce family; grows from 5 to 7 feet high, and may be found in large quantities along hedge or turn rows in cultivated fields, which the stock is kept off, but when cows or horses can get it, they invariably eat it into the ground. If cultivated, it will yield about sixty thousand weight of green food to the acre, is succulent and rich, stalk, blade and all, are consumed by them.

There is much growing in the fields around

Nashville, and it will afford me pleasure to show it to any gentleman, and convince by actual experiment how fond stock are of it.

A. J. DAVIE.

CORN SOWN FOR FORAGE.

From the Agriculturist.

I made a visit to Maury county a few days since, and whilst the driver was changing horses at Spring Hill, I examined Mr. Moore's patch of corn sown broad cast, and think it will yield more succulent food than any piece of ground of the same size that I have ever seen. It is certainly very light; entirely unfit for work animals, but I am strongly inclined to believe that it will serve a most excellent purpose for milch cows, sows and pigs, and such stock as we are too much in the habit of neglecting during the summer and fall. I am now ploughing in my rye-stubble, and after it is well broken up, I shall harrow it with an iron tooth harrow, sow from two to two and a half bushels of corn to the acre and then harrow it again, for the purpose of feeding all my stock from the first of September until just before frost. Whatever is then remaining, I intend to cut and cure for winter food.

J. S., Ed.

CAUTIONS FOR PURCHASERS OF SILK REELS. SILK CULTURE OF THIS YEAR.

To the Editor of the Farmers' Register.

Silk reels, bearing the name "Piedmontese," are for sale, at some places in the United States, that are not more than a semblance of the *genuine* Piedmontese reels. It therefore behoves persons intending to purchase reels to be on their guard.

The frame of the Piedmontese reel is $4\frac{1}{2}$ by 3 inches thick; the *pretended* Piedmontese reels have frames made of timber about half that thickness, and the axle and reel, or arms, are proportionably light and trifling. The importance of having a strong reel is pointed out in the June number of the Farmers' Register, page 350.

My rearings of silk-worms up to this time (4th of August) have been successful. About 650 pounds of cocoons have been produced, at a cost of 20 cents per pound, including cultivation of trees, and interest on that portion of the value of the cocoonery which was used. If a sufficient supply of mammoth sulphur and pea-nut eggs had been on hand, the cost of the cocoons would have been reduced to $16\frac{1}{2}$ cents per pound. This I consider a fair beginning, when it is recollected that the operations were carried on principally with negro boys. We operate entirely with hired labor, and of course are not left to conjectural estimates.

I intend to continue my rearings until the 1st of October.

LAYTON Y. ATKINS.

Stafford County, Va. August 4, 1840.

MARLING IN NORTH CAROLINA.

To the Editor of the Farmers' Register.

N. E. Branch of Cape Fear, July, 1840.

Having been enlightened on the use and application of marl, by your publications on calcareous

manures, I feel disposed to make known to you some of the beneficial results of my experience.

In the winter of 1838-9, I marled, at the rate of (say) 300 bushels to the acre, eight acres of land cleared prior to the revolution; a part of it low, wet and unproductive; soil sandy, and based on clay. Planted with corn, had an improved crop, though not equal to my expectation, owing, as I supposed, to the dry summer. Sowed said land with oats in February, and harvested, I believe, at least one hundred per cent. more than I should have done without the marl; having had a crop of oats a few years since on the same piece of land that was scarcely worth harvesting.

In the winter of 1837-8, marled about 15 acres at the rate of 150 to 200 bushels per acre; planted said land in corn in the spring of '39; had an improved crop, especially where the land was flat and rather wet. Some sour places yielded from 50 to 100 per cent. more than ordinarily. This field is now abounding in a fine growth of fennel and weeds, evincing its improved condition.

In the winter of 1838-9, marled, I judge, at the rate of 150 to 200 bushels, ten or twelve acres of land abounding in cray-fish, low, wet and sour, yielding when at rest a growth of sour grass. I did not think my crop, owing to dry weather, equal to what I expected. This land now at rest, abounding, where marled, in a growth of fennel, which I consider as a guaranty to a future crop. On similar land, marled at the same time, and at rest in 1839, I have corn growing, which, I think, from its present appearance, will yield from 50 to 100 per cent. more than land adjacent and not marled.

For some years past I have been in the habit of marling swamp land recently cleared, soil sand, and vegetable deposit; where the pine and bay trees grew in many places, there was scarcely any yield, either from an excess of vegetable matter or acidity. By the application of marl, this was at once corrected; and I find marl not only to fertilize, but to protect against excessive wet.

The rock used is the same in appearance that you recently saw and analyzed at Dr. McRee's plantation, Rocky Point. I reside 4 to 5 miles from Rocky Point, on the opposite side of the river, and on the margin of the great Holly Shelter bay or pocoson. Lands wet and swampy.

The Bishop of Worcester said, that he who made two blades of grass to grow where but one grew before, might be considered a benefactor of mankind. How justly and eminently this remark applies to one who has written and labored so long for the benefit of agriculture, as the editor of the Farmers' Register, is but too manifest.

SAMUEL BLACK.

We are gratified to learn, from the foregoing communication, of more exceptions to the *general rule of neglect* of marling, in the interesting region in which the writer resides. Let the writer but persevere, and be judicious as well as energetic in his marling labors, and he will not only be amply rewarded individually, but the example afforded by himself, and a few others, will render service of incalculable value to the state of North Carolina, in which so little has yet been done, and so much

may be done, by the use of this rich and abundant mineral treasure.

Encouraging and beneficial as have been the results of our correspondent's application of marl, they would have been much greater, if his land had been previously better drained, than appears from his words. We also warn him against the error of relying on marl alone; or of the necessity of letting vegetable matters be furnished to the marled land, (by its own growth, or otherwise,) to obtain the largest profits from marling.—ED.

DESTROYING BUSHES.

From the Maine Farmer.

The month of August has always been considered the best time in the year to destroy bushes, and it is firmly believed by a majority of farmers that the full moon of August is the very nick of time to give them their death blow.

We cannot say, nor have we yet found the man who could say from any actual comparative experiments which have been instituted, whether this was actually the case, or only an *ancient belief*, handed down from generation to generation. Be that as it may, if experience has proved that August, either in the full or the dark of the moon, is the best time to destroy bushes, it should be attended to during the time. We know, however, from actual experiment, that the most effectual mode of eradicating bushes is to tear them out by the roots. Alder bushes and elder bushes, which are very tenacious of life, can be effectually destroyed in this manner. A very large stout hook of iron is an excellent thing for this purpose. It may be attached to a chain, and a yoke of oxen will pull them out with ease and despatch. If a hook cannot be had a noose may be made round a clump of bushes by a chain or chains, a hand can bend the bushes over the contrary way from what the oxen are to draw, and thus they can be *twisted out* and completely eradicated.

There are but few farms in Maine where a week or two cannot be profitably spent in destroying bushes. And if those who have the means should thus employ their power in clearing some of the bush pastures there would be a great increase of food either for man or beast, and the appearance as well as the value of the country will be very much improved.

BERKSHIRE HOGS.

From the Farmers' Cabinet.

I find that the breeding of Berkshires is to be the order of the day for the present year; what a pity that our people will not be content without going with a locomotive force about every thing! They must, one would think, each have a small steam engine in his breast! and assuredly, in the breeding of Berkshires, they are going the whole hog. Here is one great man who declares that no Berkshire can be a *Berkshire*, unless he has three white feet and a white tip to his tail! but

when pushed upon this momentous point, he confesses he only meant, that he must have *some* white hairs on the tip of his tail; how many, he saith not! Another, equally great in the profession of hog-breeding, declares that the pure-bred Berk-hires must have *four* white feet and a *white tail*; for they must be *perfectly white*; none else being genuine; and all this, oftentimes, without regard to shape, points, or figure. I know a person in this neighborhood, who has a *Bement sow*, and a wretched looking animal for a *Bement* it is, with scarcely a good point, except the ear and the top of the tail, about her, but he had a *tip-top* pedigree with her, and that is his greatest consolation: another has a most splendid boar, but he *will not be comforted*, because he has no pedigree beyond the fifth generation.

Now what humbug is all this! But the best of it is, they are all wrong, as I, who was brought up amongst the Berkshire pigs in England, can testify; and I declare they were red or tawny, with black spots; this was always the legitimate color, and any one there would as soon think of a *blue pig* as a *white one*; but all this has been sufficient to create a speculation—a *morus-mania*, and that's enough. Now, by this time next year, the mania, I guess, will have passed away, and then we shall find that the best breeds of pigs in the world might be obtained from a cross between a good Berkshire boar, even if he have but *two* white feet and *no* white hairs in the tip of his tail, and some of the best of the Chester county sows, than which nothing finer can be found.

Since writing the above, I find a correspondent in the Cultivator has *broken ground* in favor of the red and black Berkshires, and I mean to help him: the description of a pure Berkshire, which he copies from the Complete Grazier, is worth preserving in your pages; it is as follows: "The specific characters of the true Berkshire hog are a reddish color, with brown or black spots; sides very broad; body thick, close, and well-formed; short legs; the head well placed; the *ears large* (!) and generally standing forward, but sometimes pendent over the eyes (!) The best are without bristles along the back, their hair long and curly." But, oh mores! not a word about the *tip of the tail*! Now how very different is the *true* Berkshire of the present day to the above portrait? It might be called a stuffed sausage.

But, after all, there is another breed of hogs in England, which will one day take precedence of the Berkshires for quality of meat, and these are the *Hampshires*: they are so notorious, that the people of that shire are called *Hampshire hogs*, as the people of *Essex* are called *calves*—*Essex calves*—that county being noted for the finest and fattest calves; and any person having resided in London, to which the best of every thing finds its way, must have heard mention made of *Hampshire bacon*, and tasted it too, and will bear witness to its great superiority; it always bears a higher price than any other brought to that market; the flavor is peculiar, and very different from that of the Berkshire, or any other breed; more tender; does not waste in cooking; the rind of the meat thick, but peculiarly juicy, and, what might be termed *gelatinous*. The hogs of this breed are all that need be desired in every way, and the estimation in which they are held in that part of England, will assuredly obtain for them a *run* in

the American market, after the Berkshires have had *their* run : but, how shall it be told ! even the best breeds are found of different colors, and *sometimes* with less than three white feet and no white hairs in the tip of the tail ! * * *

I shall add, the Hampshires are hardy, feed readily to a very large size, 6 or 7 hundred pounds being a common weight amongst the largest ; while pigs of six or nine months are reared to great perfection. They are, in their own country, always fattened upon barley, ground into meal, which makes by far the best feed.

JOHN BANCROFT.

P. S. We hear much now-a-days of the fine handling of cattle—and truly there is no mistake about that—but why may we not introduce the same test of thrift amongst our hogs ? it would be a pretty accompaniment to a *white tipped tail* !

Dutchess County, N. Y., July 29, 1840.

CONSIDERATION ON THE MEANS OF DIFFUSING KNOWLEDGE IN MARLING IN SOUTH CAROLINA.

From the Carolina Planter.

Some of the remarks of Mr. Ruffin, as copied from the *Farmers' Register* into the 20th No. of the *Carolina Planter*, would seem to militate against the utility of *geological surveys*. Speaking of the improvements that have taken place in the poor lands of Lower Virginia, by the use of marl, he says that "the Geological Survey had no more agency in producing this improvement than it had in exciting the Seminole war." And adds, "if it has produced any good effects to the general and agricultural interests of Virginia, of as much worth as the marling of even 100 acres of poor land, we confess that we are unacquainted with all such results." All this may, perhaps, be true. If I am not mistaken the beds of lime and marl in Lower Virginia were long known to the inhabitants, and it was not necessary therefore for the surveyors to point them out. But it certainly requires some sort of a survey to discover marl in places where it is not known to exist. You may adopt the specific term of marl survey if you please, or the generic term of geological survey—embracing the examination not only for marl, but also slate, quartz, granite, &c. &c., in short all the different substances that compose the earth ; still a survey or examination is required ; and I prefer the geological survey, as this will embrace not only the examination for substances that will benefit agriculture, but also the natural sciences and mechanic arts.

Let it not be supposed that because Mr. Ruffin has not seen good effects produced by the geological survey of Virginia, equal to the benefits arising from marling even 100 acres of poor land, that all geological surveys are of but little importance. Other states of the union have had mines of wealth developed by their geological surveys, and we do not know what is to be found in South Carolina, until the trial is made. We have had encouragement enough in the discoveries that have already been made, to commence a survey of the state ; and the importance of the subject is certainly adequate to the small amount necessary to defray its expense. I have always been under

the impression that a survey was necessary to develop all the resources of the state. Unless we have a survey how are we to know where marl exists.

QUERY.

Remarks in Reply.

The article referred to above was not designed "to militate against the utility of geological surveys" in general ; and we are very ready to admit that such surveys, properly conducted, would be the most important means of discovering, making known, and bringing into use, the hidden mineral resources of a country ; and, so far as these minerals are manures, of aiding essentially the progress of agricultural improvement. Still, we retract none of the assertions and opinions referred to above. The question then under consideration, and to which our comments particularly applied, was as to the utility and value of a geological survey for discovering *marl* and other mineral manures alone. On this point, we not only reassert all that was said before, but will further maintain, that, judging from every thing yet effected in this way, the discoveries of marl by any geological surveyor, and all useful results from such discoveries, would be beneath contempt, compared to those which have been and may easily be made by intelligent and observant cultivators, on their own and their neighbors' lands. Nor are geological and other scientific attainments necessary for such observations and discoveries. It only requires the time, leisure, opportunity, and fitness for careful and correct observation and collection of facts, which hundreds of agriculturists possess, and who, after all, are the persons who discover the important facts, which are afterwards gathered up and appropriated by geological surveyors. When things are ripe and ready for the commencement of a new improvement, any means which may be used for collecting and distributing knowledge thereon cannot fail to render service ; and such would probably be the state of things now in South Carolina, marl being the subject of inquiry, and a geological survey being used as the means for diffusing knowledge thereof. But we nevertheless maintain, that by an agricultural survey, either general or limited, that particular object would be far better effected, and, at the same time, other important subjects of agricultural improvement be aided. We do not pretend to estimate the value of the geological survey of Virginia to agricultural interests. But of this we are very sure, that if as much money as the cost of the geological survey has been and will be, had been judiciously expended for an agricultural survey, that its benefits to a degree would have been greater, beyond the power of comparison.

But if in any way, direct or indirect, proper or

illegitimate, the attention of the cultivators of South Carolina can be speedily and properly directed to this greatest of agricultural improvements, the measure will be the greatest benefit that can be conferred on that commonwealth. And even if it is preferred to seek that object by a geological survey, at an expense of \$10,000 to be appropriated every year, as long as the liberality and patience of the legislature shall hold out, and the survey to continue just so long as it is so paid for, still the object, if thus indirectly gained, will be cheaply purchased, though at a hundred times the price of a more direct and proper mode. The proper and cheapest course would be a survey limited to the discovery and testing of marl, and giving instruction in regard to its proper application, in every part of South Carolina where it exists. And if this were done, and the information, thus afforded, were appreciated and acted upon generally, the benefits would be ten thousand fold greater than the cost.—ED. FAR. REG.

STAGNANT WATER.

From the Cultivator.

Of all the causes that contribute to render soils poor and worthless, we believe there is none more active than stagnant water, on the surface or immediately below. Such soils are invariably close and tenacious, and commonly quite unproductive. Where there is a retentive subsoil, the surface generally abounds in clay, is difficult to work, and gives a less reward to labor than almost any other. This is owing to the stagnant water held by it, as none of the valuable plants can flourish in a soil so constituted. Land is liable to injury from this cause, on which water during wet weather rests on the surface for even a short period, for the roots of a plant cannot penetrate a soil freely, in which the density is such that rain water does not freely sink through it to the natural drains in the subsoil, below the ordinary range of the roots of plants. Water is essential to the growth and perfection of plants, but water that does not circulate, or which exists in too great quantities, is fatal to them; and the first thing to be done, is to free soil from this incumbrance, if we would give it productiveness, and render it easy of culture.

It is from these well known effects of stagnant water, when on the surface, or within reach of the roots of plants, that the necessity of draining arises, and which system of operating, when fully carried out, completely changes the character of lands submitted to such a course. Manures applied to soils abounding in stagnant water, can produce little effect; the salts they contain are diluted, and cannot produce that action, or circulation of atoms, which appears absolutely necessary to productiveness. In clay, or in stagnant water, where substances are not exposed to heat and atmospheric agencies, decomposition is slow. Every farmer knows that manures produce much more effect on loam, gravel, or drained clay soils, than on those so retentive as to have water on or near the surface.

Draining them, and aeration, or the exposing the soil to atmospheric action, to the influence of the sun and air by deep ploughing, seems to be the only thing that can be relied on to correct this serious evil.

Instances indeed occur in which the wetness of land is produced by springs, which rising from the earth spread over it; but in far the greater number of cases, the stagnant water is owing to a retentive subsoil, that prevents the escape of such water as falls upon it. In either case, however, the remedy is the same; and in the language of Morton on Soils, complete and perfect draining is the foundation of all improvement in husbandry, and it should, therefore, be the first step which we take in attempting to improve or ameliorate the soil.

A very large proportion of the lands in this country, are of that class that suffer more or less from the accumulation of water. No person can traverse it in various directions, without being sensible of this fact; and in consequence of such liability to suffer, the land in many districts is cold and poor, as land not freed from stagnant water always must be. The hard pan lands which cover so large a portion of the country, may be named as belonging to this class, though some of these contain more clay than others, and are therefore more shallow and difficult to work than others, where the subsoil, although still too retentive, lies deeper, and is therefore not so injurious as the first kind is well known to be.

Much of this hard pan, when freed from its stagnant water, drained and ploughed, will become very fertile and productive; indeed there is no case in which a soil cannot by sufficient labor and expense, be made precisely what is desired. The native earths that go to constitute soils, the clay, sand, and lime, in themselves do not make a soil productive; properly mixed and proportioned they constitute a base for the action of the vegetable and animal manures, and the various salts or stimulating agents, that excite the organs of plants to vigorous action, and enable them to make these secretions from the matter furnished them, to be appropriated to the growth of the plants. Man, then, has only to do what nature in some cases has herself done; that is, so proportion the several ingredients that go to make a productive soil, that the desired result shall be attained. Chemical analysis has here come to the aid of the agriculturist, and shown him precisely the proportion of the earths, and the nature of the ingredients that are necessary to make a soil fertile, and the causes that tend to advance or retard such a consummation. Where water is too abundant, it must be removed by draining; where the soil is too compact, it must be loosened by deep or subsoil ploughing; where the proportion of clay is too great, sand must be added until it is sufficiently friable; if lime is absent, it must be added; if animal or vegetable matter is wanting it must be supplied; and if the soil is too light and porous, clay will be found a remedy most effectual.

Whatever difference of opinion, therefore, may be entertained of the best methods of freeing land from stagnant water, there can be no reasonable doubt of its propriety or necessity. To the farmer who has lands wet, cold, and difficult to cultivate, we would say, free your soil from all stagnant waters to the depth of eighteen or twenty-four

inches; loosen it to that depth, either at once or gradually, and there will be no difficulty, under a judicious course of cultivation, of producing on lands now of little value, all the most important products of agriculture.

THE OPPRESSION OF THE FENCE LAW, AND THE DAWN OF RELIEF.

Since the year 1835, when the petition to the legislature of Virginia for relief from the general law in regard to inclosures was rejected, very little has been said in this journal in regard to that subject, which before had occupied so conspicuous a place, and engaged the pens of so many correspondents. Our own silence, under this heaviest and most absurd of all the injuries imposed on agriculture by the legal policy of Virginia, was not founded on content, nor submission to this iniquitous system, by the operation of which agriculture, in the eastern half of Virginia, is annually robbed of more than half of its otherwise clear profits. Nor was it in despair of any mitigation of the evil, desperate as may be hopes of any aid being given voluntarily to agricultural interests by the legislature of Virginia, or of the legislature being urged to such action, for the first time since the Virginian declaration of independence, by the now demagogue-governed people. Our silence was caused by the belief that it would be more conducive to ultimate success in this matter, to leave undisturbed the seeds of reform which had been planted, to spring up, grow, and flourish, and show their good fruits, and thus to exhibit in their results manifest and undeniable evidence of the good operation of the change. At the same session at which the petition for a change of the general fence law had scarcely been permitted to be heard, another petition, which we had originated, and which asked only for partial, but yet very extensive relief, passed without opposition. We allude to the petition (published at page 450, vol. ii., *Farmers' Register*), and the law passed in compliance therewith, for making the tide-waters of the James and Appomattox rivers and their tributaries "lawful fences." In asking for this great measure of relief, we took for example, and profited by as a precedent, a previously passed law for making the upper Appomattox a lawful fence. At every session since, and in answer to different petitions, other laws have been passed, extending the principle as to various other streams. No opposition has been made to this most valuable and fast extending mode of relief; and the more it is extended, the stronger are the reasons for continuing to extend it, in answer to other claims; and the more effectually is *right* aided by *pre-*

cedent, which even in aid of *wrong*, is far more powerful than truth and reason and justice, alone, when opposing old abuses. Fences along the borders of all water courses, and below as well as above the head of tide, are as much required by the general law of enclosures, as in any other situations; and they are much the most expensive lines to fence, and the fencing operation which is the least demanded by the usual circumstances of the lands and their proprietors. If, then the proprietors on all the considerable water-courses will ask for and obtain relief even thus far, this alone would avoid in lower and middle Virginia the now legal requisition of keeping up perhaps several thousands of miles of perishable and useless fences, which are maintained at an annual expense which, if so diverted, would pay the expense of all the *useless* part of the sessions of the legislature, or *almost* pay for constructing the James River canal. Let then this great, though partial measure of relief be obtained, for all localities to which it could not be denied; and then the advantages would be so manifest, so extensive, and the evils so small in comparison to the benefits secured, that proprietors generally would be satisfied of the magnitude and the uselessness of their still continuing burdens; and even *non-proprietors* would learn that they had lost nothing by the restraining of their now existing and time-honored *right of legal trespass* on their neighbors' lands. We are entirely assured that nothing is wanting but to see the operation of the change of system, to make it desirable to nine-tenths of the community.

There is another imperfect yet very important means of reform, and of relief from the existing tax of the fence law in certain situations, where the legal burden would otherwise be almost ruinous. This is by voluntary agreement of the proprietors of a number of contiguous farms to dispense with all fences, except a general enclosing fence of the whole neighborhood, and the separate enclosures for pasture, which each individual should have for his own stock, on his own ground. Such a measure we induced the commencement of, some ten years ago in the neighborhood in which we formerly cultivated and resided, in Prince George county; and the space so included has gradually been extended, until there are now twelve or more farms under one general surrounding fence. There are certainly some inconveniences and disadvantages found in this new plan, owing to there being no legal sanction to the agreement; and the performance of every man's obligations to his neighbors being governed only by his sense of duty and of self-interest. But even if the sense of moral obligation be weak, that of

self-interest is strong; and the latter principle of action is brought more and more into play, as the number of farms so enclosed together are increased. If any one of the individuals uniting in such a plan permits his live-stock to trespass, his own fields are likely to suffer worse than his neighbors'. With all the disadvantages incurred, in consequence of the absence of all support of right by law, in this respect, it is nevertheless certain, that under this plan of voluntary agreement, and without any separate surrounding fence, our own fields have been, in the general, better secured from trespassing animals, than before the adoption of the plan, and with all the previous protection of separate fences, and of the law against the trespasses of mischievous animals. Within this large general enclosure (including fully 5000 acres) there are parts now under profitable tillage, and annually improving in product, which before lay waste, because the proprietors could not afford to fence them separately; and if this beneficial agreement were now annulled, these, and much more of other tracts, would again become waste, for the like reason. And what is here so manifest, on a comparatively small scale, is in the continual course of operation throughout all the old settled parts of Virginia; but which is not seen or appreciated, or the great and growing evil not ascribed to its true and sole cause, the existing law of enclosures. There are now thousands of acres thrown out of culture, and rendered waste and worthless, and the quantity is annually increasing, because the expense of enclosing according to law is unquestionably greater than the profit of tilling the land. And there is perhaps twenty times as much land still kept fenced for cultivation, merely because it has been always so kept, and the expense never estimated, but which ought also to be thrown out of tillage, because yielding less than enough to maintain the separate fences.

Every old and extensively cleared neighborhood furnishes a proper field for action, for such a voluntary association, under a general ring fence. If prejudice at first opposes a more general extension, let two neighboring proprietors alone commence the plan. Others will soon desire to share the obvious benefits; and the space so enclosed will every year be extended. And there is little danger that any individual will desire to return again to the blessings of such protection of the law, who has once enjoyed exemption from the enormous tax of the altogether *useless* fencing required by law.

The increase of number and extension of such voluntary associations will, in time, cause the just claims of the numerous individuals concerned to be heard; and the aid of legal sanction will be

given to the several voluntary obligations. The enactment of private laws for such objects, or rather of general laws permitting and sustaining such voluntary associations, under suitable regulations to maintain right, and redress wrong, between the parties, is all that would be necessary for relief from the great oppression and enormous tax which are now in full force. Then, those neighborhoods which now suffer most could obtain relief from the greater part of the grievance, without affecting the interests or even offending the prejudices of others; and the parts of the country not requiring such relief would continue to enjoy the benefit of the present general law and policy in regard to enclosures.

These remarks are submitted to our readers, as suggestions for different modes of action tending to promote the great and beneficial object in view. Let each one, who concurs in the general views, exert his influence to forward one or the other mode of procedure, and the agriculture of Virginia may in a few years be relieved of a burden which bears on it more heavily than the millions of public debt already incurred for the generally misdirected "internal improvements" of the state.

—ED. FAR. REG.

AGRICULTURAL MORALITIES.

From the Cultivator.

Messrs. Editors.—I am a plain man, not versed in metaphysical subtleties or legal abstractions, but I have my notions about right and wrong, old fashioned, perhaps; and I sometimes meet with things that rather run counter to my ideas of what is correct, and I wish to state some of my difficulties for you or some of your correspondents to remove, should you deem them worthy of notice.

There seems to be but one opinion respecting the men who wilfully injure the property of their neighbor. If I should poison the spring of my neighbor, mix arsenic with the oats fed to his horses, or feed nux vomica to his sheep, I should probably be committing an offence against the laws that would subject me to a deserved punishment. If I should girdle or cut down his apple trees, set fire to his woodlands or fences, obstruct his water courses, turn animals into his wheat fields, or turn his stock into the highways, I should deserve, and should receive, the execrations of every honest man, in addition to the exposing myself to retributive justice. All these are considered crimes, and their magnitude is estimated by the injury done or intended to be done to my neighbor.

Now I would ask where in *reality* is the difference between the above class of offences, and acts I shall now specify. I carry to market a load of clover seed, or a friend applies to me for a bushel for his own use. I know, but the buyers do not, that there is a plentiful sprinkling of Canada thistle seed in it, and that if sown on his farm, it will be

the means of stocking his soil with that pest of the farmer. I have some wheat that is in great demand for seed, I am aware that it is full of stein krout or charlock, but the purchaser does not notice their presence, and I make a good bargain in common parlance, by saying nothing about it. I have some corn, that resembles some valuable and celebrated variety, and I take advantage of the ignorance of my friends and others, to sell it to them for high prices, while I am aware that it has not a single feature of the corn they imagine it to be. I might enlarge this catalogue of similar acts, but enough has been given to illustrate my meaning.

I repeat the question, wherein does the guilt of the man who feeds his neighbor's horses with arsenic, differ from his who sells his neighbor the seed of the Canada thistle? For my part I am simple enough to consider the latter the greater offence. The crime is the destruction of property. In the one case it is the destruction of a few animals that can be replaced: in the latter the farm itself is comparatively ruined. Ask a Pennsylvania farmer which he would choose, to lose his best span of horses by poisoning, or have his fifty or his hundred acres stocked with the thistle, stein krout or charlock; and if he understands the nature of these plants, he would not hesitate an instant. The injury in one case would be but a trifle, compared with the other; why then should not a corresponding estimate be formed of the crime?

I make these remarks because I do not imagine the crime of injuring others in these ways, is sufficiently realized by farmers and others. The man who puts off spurious animals for good ones; who sells impure or bad seed for clean or proper ones; who knowingly injures his neighbor or the public in these and other common methods of fraudulent imposition and puffing, is not to be held guiltless, because he does not put his hand in a pocket and extract its contents directly, or because he does not commit other overt acts against the majesty of the laws. *He does not do as he would be done by*; a plain unsophisticated test of conduct, to which all would do well to take heed; at least such is the opinion of an

OLD SCHOOL MAN.

BERKSHIRE HOGS.

From the Farmers' Cabinet.

Mr. Editor.—I have just seen a Bement, which, for the honour of old Berkshire, I trust is no Bement. It would be in vain to attempt to describe him, for from the sole of his foot to the crown of his head he is about one of the ugliest little wretches that can be imagined; his capacity for improvement is however great, for his belly would serve two such and to spare. If, however, upon trial, it might not contain quite all that *two* may wish to eat, there is a hollow behind his shoulders that would take some, and add not a little to his figure. But, strange to say, this pig is the best of four that were sent from Albany, to a person in this part of the country, as very superior—in short, as little Bements! Where the other three are located I know not; but if this pig were mine, he would soon find his way "back

agin." I understand that his present possessor cannot believe that he is so old as he is represented to be—he is so small. This reminds me of the negro's pig, which, although he was very little, as the purchaser complained, Sambo assured him he was "berry ole." There is, however, a *Lossing* in the same pen with him, which has been sent to show the difference; he is much better to be sure, but if that gentleman would come this way some day, the owner could show him a pen of pigs a single Berkshire cross that would astonish him, although he is not a native.

Now, I have a strong suspicion, that the four very inferior pigs above-mentioned, were pigs of the first litter—and if so, all is accounted for; for it is a fact that I have often proved, the first litter of pigs are always very inferior, and it is oftentimes with difficulty that they can be raised at all—I should say *never* to credit or profit, unless the breeder has an order for pigs from persons living at a distance, who are pretty sure to come in for the cullings after the best have been selected by the purchasers *in person*,—then, there might be profit, but I should prefer the credit, I must confess. The fact has been so long known, namely, that pigs of a first litter are always inferior, that out of it has grown the old adage, "The calf of a young cow, the pig of an old sow," that is, for rearing stock; and I have had repeated proofs of the truth of the observation.

There is no one who approves more of the Berkshires as a cross than I do, but I fear there are some men in some parts who are hasting to grow rich; and there is another proverb, you know—but which I am not of course going to apply to them—which says, "he that hasteth to grow rich will scarcely be"—but there——. SIAM.

N. J., July 30, 1840.

THE SMALL FARMS OF BELGIUM.

[From the 'Third Report of George Nicholls, Esq., containing the Result of an Inquiry into the Condition of the Laboring Classes and the Provision for the Relief of the Poor in Holland and Belgium.]

The extensive manufactures which at no very remote period flourished in Belgium appear to have congregated a numerous population of artisans in and around the great towns. As the scene of manufacturing industry changed, this population was deprived of its means of handicraft employment, and was compelled to resort to the cultivation of the soil for subsistence. This seems to have been the chief, though possibly not the sole origin of the system of small farms, which still prevails, and which are cultivated by the holder and his family, generally without other assistance. The farms in Belgium very rarely exceed 100 acres. The number containing 50 acres is not great. Those of 30 and 20 acres are more numerous, but the number of holdings of from 5 to 10, 15, and 20 acres is very considerable, especially those of the smaller extent; and to these I chiefly confined my inquiries.

The small farms of from five to ten acres, which abound in many parts of Belgium, closely resemble the small holdings in Ireland; but the small Irish cultivator exists in a state of miserable privation of the common comforts and conveniences of civilized life, whilst the Belgian peasant farmer

enjoys a large portion of those comforts. The houses of the small cultivators in Belgium are generally substantially built and in good repair: they have commonly a sleeping-room in the attic, and closets for beds connected with the lower apartment, which is convenient in size. A small cellarage for the dairy, and store for the grain, as well as an oven, and an outhouse for the potatoes, with a roomy cattle-stall, piggery, and poultry-loft. The house generally contains decent furniture, the bedding sufficient in quantity; and although the scrupulous cleanliness of the Dutch may not be every where observable, an air of comfort and propriety pervades the whole establishment. In the cowhouse the cattle are supplied with straw for bedding; the dung and urine are carefully collected in the tank: the ditches had been scoured to collect materials for manure; the dry leaves, potato-tops, &c. had been collected in a moist ditch to undergo the process of fermentation, and heaps of compost were in course of preparation. The premises were kept in neat and compact order, and a scrupulous attention to a most rigid economy was every where apparent. The family were decently clad, none of them were ragged or slovenly, even when their dress consisted of the coarsest material. The men universally wear the blouse, and wooden shoes are in common use by both sexes. The diet consists to a large extent of rye bread and milk; the dinner being usually composed of a mess of potatoes and onions, with the occasional addition of some pounded ham or slices of bacon. The quantity of brown wheaten bread consumed did not appear to be considerable. I need not point out the striking contrast of the mode of living here described, with the state of the same class of persons in Ireland; and it appears important to investigate the causes of this difference.

In the greater part of the flat country of Belgium the soil is light and sandy, and easily worked; but its productive powers are certainly inferior to the general soil of Ireland, and the climate does not appear to be superior. To the soil and the climate, therefore, the Belgian does not owe his superiority in comfort and position over the Irish cultivator. The difference is rather to be found in the system of cultivation pursued by the small farmers of Belgium, and in the habits of economy and forethought of the people. The cultivation of the small farms in Belgium differs from the Irish—1st, in the quantity of stall-fed stock which is kept, and by which a supply of manure is regularly secured; 2d, in the strict attention paid to the collecting of manure, which is most skillfully managed; 3rd, by the adoption of a system of rotation of five, six, or seven successive crops, even on the smallest farms, which is in striking contrast with the plan of cropping and fallowing the land prevalent in Ireland.

In the farms of six acres we found no plough, horse, or cart; the only agricultural implement, besides the spade, fork, and wheelbarrow, which we observed, was a light wooden harrow, which might be dragged by hand. The farmer had no assistance besides that of his wife and children, excepting sometimes in harvest, when we found he occasionally obtained the aid of a neighbor, or hired a laborer at a franc per day. The whole of the land is dug with the spade, and trenched very deep; but as the soil is light, the labor of

digging is not great. The stock on the small farms which we examined consisted of a couple of cows, a calf or two, one or two pigs, sometimes a goat or two, and some poultry. The cows are altogether stall-fed, on straw, turnips, clover, rye, vetches, carrots, potatoes, and a kind of soup made by boiling up potatoes, peas, beans, bran, cut hay &c. into one mess, and which being given warm, is said to be very wholesome, and to promote the secretion of milk. In some districts the grains of the breweries and distilleries are used for the cattle, and the failure of the Belgian distilleries has been reckoned a calamity to the agriculture of the country, on account of the loss of the supply of manure which was produced by the cattle fed in the stalls of these establishments.

The success of the Belgian farmer depends mainly upon the number of cattle which he can maintain by the produce of his land, the general lightness of the soil rendering the constant application of manure absolutely necessary to the production of a crop. The attention of the cultivator is always therefore especially directed to obtain a supply of manure. Some small farmers, with this view, agree with a sheep-dealer to find stall-room and straw for his sheep, to attend to them, and to furnish fodder at the market price, on condition of retaining the dung. The small farmer collects in his stable, in a fosse lined with brick, the dung and urine of his cattle. He buys sufficient lime to mingle with the scourings of his ditches, and with the decayed leaves, potato-tops, &c., which he is careful to collect in order to enrich his compost, which is dug over two or three times in the course of the winter. No portion of the farm is allowed to lie fallow, but it is divided into six or seven small plots, on each of which a system of rotation is adopted; and thus, with the aid of manure, the powers of the soil are maintained unexhausted, in a state of constant activity. The order of succession in the crops is various; but we observed on the six-acre farms which we visited plots appropriated to potatoes, wheat, barley, clover (which had been sown with the preceding year's barley), flax, rye, carrots, turnips or parsnips, vetches, and rye for immediate use as green food for the cattle. The flax grown is heckled and spun by the farmer's wife, chiefly during the winter, and we were told that three weeks' labor at the loom towards the spring enabled them to weave into cloth all the thread thus prepared. The weavers are generally a distinct class from the small farmers, though the laborers chiefly supported by the loom commonly occupy about an acre of land, sometimes more, their labor upon the land alternating with their work at the loom. In some districts, we were informed, every gradation in the extent of occupancy, from a quarter or half an acre, to the six-acre farm is to be found; and in such cases more work is done in the loom by the smaller occupiers.

The labor of the field, the management of the cattle, the preparation of manure, the regulating the rotation of crops, and the necessity of carrying a certain portion of the produce to market, call for the constant exercise of industry, skill, and foresight among the Belgian peasant farmers; and to these qualities they add a rigid economy, habitual sobriety, and a contented spirit, which finds its chief gratification beneath the domestic roof, from which the father of the family rarely wanders in

search of excitement abroad. It was most gratifying to observe the comfort displayed in the whole economy of the households of these small cultivators, and the respectability in which they lived. As far as I could learn, there was no tendency to the subdivision of the small holdings: I heard of none under five acres held by the class of peasant farmers, and six, seven, or eight acres is the more common size. The provident habits of these small farmers enable them to maintain a high standard of comfort, and is necessarily opposed to such subdivision. Their marriages are not contracted so early as in Ireland, and the consequent struggle for subsistence among their offspring does not exist. The proprietors of the soil retain the free and unrestricted disposal of their property, whether divided into smaller or larger holdings. The common rent of land is about 20s. an acre, and the usual rate of wages for a day laborer is a franc (or 10d.) a day.

A small occupier, whose farm we examined near Ghent, paid 225 francs per annum for about two bonniers, or six acres of land, with a comfortable house, stabling, and other offices attached, all very good of their kind; this makes the rent (reckoning the franc at 10d.) equal to 9l. 7s. 6d. sterling per annum; and if we allow 3l. 7s. 6d. for the rent of the house, stabling, and other offices, there will be 6l. or 1l. per acre for the land, which accords with the information we obtained at Antwerp, Brussels, and other places, as to the rent of land in the flat country, the soil of which is generally of the same quality throughout. This farmer had a wife and five children, and appeared to live in much comfort. He owed little or nothing he said, but he had no capital beyond that employed on his farm. We questioned him respecting his resources in case of sickness. He replied that if he were ill, and his illness were severe and of long duration, it would press heavily upon him, because it would interrupt the whole farm work; and in order to provide for his family and to pay the doctor, he feared he should be obliged to sell part of his stock. If his wife and family were long ill and he retained his strength, the doctor would give him credit, and he should be able to pay him by degrees in the course of a year or two. The thought of applying for assistance in any quarter appeared never to have entered his mind. We suggested that the Bureau de Bienfaisance, or charitable individuals, might afford him aid in such a difficulty; but, with evident marks of surprise at the suggestion, he replied cheerfully that he must take care of himself. If a sick club or benefit society were established among these people, so as to enable them by mutual assurance to provide for the casualty of sickness, the chief source of suffering to their families would be obviated, and there would be little left to wish for or amend in their social condition.

EXTRAORDINARY SALE OF FOXHOUNDS.

The most remarkable sale of hounds ever known, took place a few days ago at Hyde-park-corner; the lots were thirteen in number, making 127 hounds exclusive of whelps; their produce was 6,511 guineas, or upwards of one hundred pounds per couple! The pack which realised this

enormous sum was "the Osbaldeston," which has hunted the old Berkeley county (Hertfordshire) under the mastership of Harvey Combe, esq.; the Earl of Cardigan was one of the principal buyers.

WILD SILKWORMS OF ASSAM AND THEIR PRODUCTS.

From the Penny Magazine.

The warm climate and prodigious variety of insects of the southern parts of Asia has recently induced Europeans to examine such parts of that quarter of the world as are open to them, with a view to finding other caterpillars which produce silk as well as the common silk-worm, and perhaps also some kinds which may be able to feed themselves and spin their webs in a wild state, without demanding the plantation of mulberry-trees, and the unremitting attendance which that insect requires. It has been long known that several species of wild silk-worms exist in India, and millions of cocoons are annually collected in the jungles of that country and brought to the silk factories of Calcutta: it is said that these insects cannot be domesticated, because the moths take flight as soon as they are produced; but the experiment has been tried, on a small scale, of keeping them under a mosquito curtain, and found to answer; it would seem, however, that in a country where they are produced and maintained spontaneously in great abundance, there would be little advantage in domesticating them, unless the produce were greatly improved by cultivation, which the experiment does not state. The only attention now required is to gather the cocoons when formed; in addition to which, in some parts of India, the natives remove the young worms from the jungles, and transfer them to trees which grow near their own dwellings, where they may be defended from the dangers to which they are liable, and where the cocoons can be more easily collected.

The province of Assam, on the banks of the Brahmaputra, which until the termination of the Burmese war was nearly closed against Europeans, is now an English dependency: its resources have been investigated, and, among a variety of hitherto unknown productions, nearly a dozen species of silk-worms have been found there, some of which have been long cultivated by the Assamese, and large quantities of the produce exported to the neighboring countries. One of these is the muga-worm, which feeds on a variety of trees, and is never reared in the house. We may begin our account of the muga from the hatching of the eggs, which are deposited by the females on wisps of dry grass. These wisps the natives expose to the sun for about ten days, when a few worms begin to show themselves. They are then hung up in a tree which has been selected for the purpose, and as the young worms hatch successively, they find their way one after another to the leaves of the tree. To prevent them from coming to the ground, fresh plantain leaves are tied round the trunk of the tree, on the smooth surface of which they are unable to crawl; if any worms fall off, they are carefully picked up and replaced on the tree, round which the ground is cleared of jungle that they may be more readily

seen if they fall. When once placed upon the tree the worms feed themselves, and so far they cause much less trouble than the mulberry-worms which must have the leaves brought to them; but they must not by any means be left to themselves, as they are subject to the assaults of many enemies. The first against which it is important to protect them is the ant, which must be destroyed before the worm is placed upon the tree. To effect this the trunk is rubbed with molasses, and hung with fish and dead toads and frogs; and the ants, which are collected by the smell, are burned by fire; this process is repeated until not an ant is left near the tree. The worms, when they grow larger, are tempting morsels for many birds, which lie in wait upon the neighboring trees, and never fail to pick off a few when not closely watched. Their nocturnal enemies are rats, bats, and owls, whose ravages can never be entirely prevented.

The worm thrives best and produces the finest silk in dry weather; but it is not seriously injured by rain unless very heavy, as it invariably conceals itself under the leaves on the approach of a shower. It soon destroys all the leaves of one tree, and is then removed to another, by means of bamboo dishes fastened to the ends of long poles, which are raised among the branches; it crawls upon these dishes, which are then placed against a fresh tree, to the leaves of which the hungry worm soon finds its way. During thirty days the muga-worm remains upon the tree; it has four moultings like the ordinary silk-worm, but requires no particular attention on that account. At length when ready to spin it begins to descend the tree, but is stopped by the circle of plantain leaves. Here it is gathered in baskets, brought into the house, and placed beneath bundles of dried leaves suspended from the roof: in these bundles they spin their cocoons, which are generally stuck two or three together.

The process is after this not very different from that employed with the common silk-worm. The cocoons, with the exception of such as are selected for the next brood, are exposed to the action of heat, to destroy the chrysalis, they are then boiled for an hour in a weak solution of potash, and wound off; not reeled in one continuous thread like common silk, but spun like cotton or worsted. This of course produces a thicker and harsher thread, but it has not been practicable to follow a better method; though it is likely that further experiments and greater skill may be found to overcome the difficulty. The separation of the worms before spinning would probably keep the cocoons more perfect, and consequently easier to wind off. It would also be necessary to prevent piercing the cocoons; a practice resorted to by the hill tribes for the purpose of getting at the chrysalis, which they consider a great dainty: this of course destroys the continuity of the thread.

The muga is a good deal larger than the mulberry worm. It measures, when full grown, nearly four inches in length, and is then transparent, of a bright yellow color, with small red and brown spots; it makes a cocoon about two inches long, and of proportionate thickness. It feeds on a variety of trees, most of which spring up spontaneously in spots cleared for the cultivation of rice or cotton, and the color and quality of the produce vary according to the species of tree on which the

worm is fed. These trees are usually transplanted to the neighborhood of the dwellings of the peasantry, to whose comfort the manufacture of muga-silk largely contributes; as it affords a profitable occupation to the youngest and weakest of the family, whose services would be unavailable for any other object: in fact, except at hatching and spinning-time, these worms require little more than close watching to prevent the intrusion of enemies; and this can be done by children, or very old persons, or by those who are employed in spinning, weaving, or basket making, the ordinary occupations of the peasantry of Assam.

The total duration of a breed of worms is about seventy days, and it is repeated five times in the year. An acre of land produces about fifty thousand cocoons per annum making twenty-five pounds of silk, which is worth from 6*l.* to 7*l.* of our money. It is estimated that 50,000 lbs. are annually made in Assam, of which somewhat less than a half is exported. It sells from 5*s.* to 6*s.* 6*d.* per lb., and is woven into cloth for scarfs, turbans, sashes and similar articles.

Another valuable and important silk-worm is the eria or arindy worm. This is reared entirely in the houses of the peasantry, and is fed chiefly on the palma Christi, or castor-oil plant, which requires little culture. Although the eria-worm is reared wholly under cover, it does not demand so much attention as the mulberry-worm; though there is no very important difference in their management. When they spin, they are put into baskets filled with dry leaves, in which they make their cocoons, like the muga-worms, in bunches of two or three together. The worms before they spin are either white or green, and it is remarkable that the white ones invariably spin red silk, and the green ones white. They are not reeled, but spun like the muga cocoons.

It is conjectured that more than 80,000 pounds of eria silk are annually in Assam, and nearly all this large quantity is consumed in the country: it is the constant dress of the poorer classes, and, in the cold season, of the richer also. The stuffs made from it are at first coarse and stiff, but repeated washings cause them to become silky, soft, and glossy.

The cultivation of this worm appears to be worth more attention than has hitherto been given to it; it grows rapidly, and twelve broods have been perfected in one year. It is reared in almost every house in Assam, and may be increased to any extent. The silk, though coarse, is warm and durable, and may be bought in the cocoon at little more than a shilling a pound. One account of it says, "It gives a cloth of seemingly loose coarse texture, but of incredible durability; the life of one person being seldom sufficient to wear out a garment made of it, so that the same piece descends from mother to daughter." A small sample sent to England was judged by some manufacturers to be an excellent article for making shawls like those of Cashmere. In addition to the silk, the castor-oil which is produced from the palma Christi might also be taken into the account, as little or no injury results to the plant from stripping it of leaves to feed the worms.

The other recently discovered silk-worms are of less importance at present, though some of them are likely to be useful eventually. One sort, the deo-muga, produces a beautiful thread of great

lustre, and though now confined to Assam, feeds upon the pipala tree (*ficus religiosa*) which grows abundantly all over India. Another sort is of very large size, the moths measuring ten inches from wing to wing. Of several others the distinguishing characteristics are as yet scarcely known; but as the attention of Europeans in India has been called to this subject, it is not likely that any really valuable sort will long remain undiscovered.

THE GENERAL FAILURE OF SILK-WORM REARINGS, THIS SEASON.

Although there have been sundry cases of good success this year in raising silk-worms, it is nevertheless certain that the far greater number of trials have resulted in general or entire failure. In most cases, no doubt, abundant causes for failure were to be found. The unusual quantity of rain, and prevalence of damp air—the unfitness of the buildings—the trusting to eggs from diseased worms—the watery and weak kind of food presented in young multicaulis leaves of the most forced and tender growth—and bad management in general—one or all have served, (and could hardly have failed,) to produce most of the disasters which have occurred. But, in some other cases, where every care was used, and no labor or expense spared that was deemed necessary, the results have been almost as disastrous as any. We confess our utter inability to account for such extensive failures; which are so much the more mysterious as compared to the general marked success of last year, in this part of the country, wherever eggs of healthy stock were used.

The grounds of our own false confidence, in very different results, are already before the readers of this journal. Last year, a quantity of silk-worm eggs, sent to Petersburg for sale, began to hatch as early as the 13th of April. The hatching eggs and worms were given to every person who would take them; and thus some twenty or more individuals, in this neighborhood, and at much greater distances, were induced to make their first trials. There being no previous preparation, or suitable arrangements, all these feedings were necessarily conducted under great disadvantages; and, in every case, the worms must have suffered much from cold and wet weather, want of food, want of space, or want of cleaning, and generally, from *all* these evils; yet, in all these trials, we heard of no case of disease, not so much indeed as of a single worm in a whole rearing; and every lot of worms, that did not suffer from absolute starvation, (as some did in this town,) produced satisfactory results. Our own experiment, and ignorant practice, with a portion of these worms, was stated at length in the 6th num-

ber of our last volume; and our disadvantages and bad management were not worse, nor the success greater, than those of several others of our intimate acquaintance, of whom we inquired, and heard their progress and results. In the same season and sometimes under the care of the same individuals, other broods from other sale eggs were as much diseased, and proved an entire loss, as is the general state of things this year. These broods we naturally inferred to be (as most likely they were,) the produce of diseased stocks; and we also inferred, from the different results in other cases, that with good eggs, and good management, a rearing could scarcely fail of success. The particular stock of worms which had proved to be so universally healthy, we even designated by the name of "hardy," and attached peculiar value to them, because of their so well deserving that character in all the rearings of 1839. Yet, from our own eggs of that valued stock, carefully saved as supposed, we have not this year saved an egg, because none of the broods were healthy; and other persons who thought as highly of the stock, and whose management and arrangements were much better than ours, have fared no better, and have lost the whole brood from their crops of eggs, as we did of our own.

But discouraging as these numerous and unaccountable failures are, we trust they will not induce the abandonment of the business, by any one who before desired, and *is prepared*, to carry it on; but they ought to induce increased care in management, and caution in limiting the extent of early trials. It is certain that *without proper arrangements* failure will be inevitable. We have lost nothing of our previous and entire distrust of eggs from sickly worms and suspicious sources. But we *have* lost the confidence, so entirely felt, in the healthiness of worms produced from known healthy parents. We pretend not to solve the mystery, nor even to guess at any sufficient or satisfactory causes of the general state of disease among silk-worms this season. But we incline to believe that much of it may be justly attributed to the total disregard of Dandolo's rules for preserving eggs. Instead of guarding them carefully, as he directs, during the whole time of their keeping, against dampness, and extremes both of high and low temperature, all the eggs in this country have been exposed to some or all of these evils; and all of us have supposed that this exposure could do no harm, because eggs greatly so exposed had been found to hatch well. But most of the careful experimenters of this year must now be satisfied that eggs may hatch well, and the worms live, and thrive for some time afterwards, and yet the stock be so tainted, in some way, as

that most of the worms will perish before maturity. There must be some sufficient cause for such general and mysterious effects; and the discovery of it may yet give to silk-culture in Virginia as fair prospects of success, as it had in our overweening confidence, before the occurrence of the failures of this season. Any information on this subject, or opinions from older and better experimenters, we shall be pleased to receive and lay before the public. None will be more gratified than we shall be, to have this great and unexpected obstacle to silk-culture removed. But, in the mean time, neither the pride of opinion, nor unwillingness to confess mistake and ignorance, shall, in this, or any other case, prevent our stating fairly and truly the existing circumstances, adverse as they may be to our previous anticipations, and even mortifying to our confident self-conceit.—*ED. FAR. REG.*

REMARKS AND INQUIRIES IN REGARD TO MR. SELDEN'S CHANGE OF ROTATION.

To the Editor of the Farmers' Register.

I had prepared a communication for your July number, advocating an improved three-field course of crops now in progress on my farm. But before it was mailed, accident attracted my attention to a republish of the communication of John A. Selden, esq., published in the January number of the Register, detailing a contemplated five-shift rotation. My mind was so forcibly impressed with the superior advantages of his course, and the conclusive reasoning by which it is sustained, that I abandoned the intention of entering the arena as a principal, and have been content to enlist as a subaltern under the banner displayed from Westover. This, to a proud mind, plentifully top-dressed (as Mr. Garnett would say) with agricultural conceit, is, perhaps, a humiliating confession. But truth vanquishes pride, and sincerity impels the avowal, that, for a *wheat farm*, Mr. Selden's rotation *can*, in my judgment, have no superior. His reasoning is based on a perfect knowledge of vegetable physiology; and there cannot be a shadow of doubt, but his theory, when reduced to practice, must result in entire success.

There is but one difficulty that has presented itself; and as the contemplated system has nearly run the first year of its course, it can be cleared up, and I trust, in your columns, Mr. S. will give the necessary explanation. In detailing his plan, he says, "as the oat crop is so valuable a one with me for seeding my teams, I propose seeding one-third of the field intended for peas in that crop, and on which I propose to put my manure. Should the manuring extend farther than the third for oats, I propose putting the remainder of the manured land in pumpkins, and the balance of the field of course in peas, &c." To this apportionment of the precedent crops on the field designed for wheat, I have no objection, but have serious doubts, whether he can do full justice to his manure heap. Oats are, or ought to be, sown early in March—too early, I should think, to break up the

winter farm-pens and haul their crude and unfermented contents to the field. I have never found manure made in the winter in a proper condition to apply to any crop earlier than April; and without some extraneous management it would be, I imagine, less so in March. I trust the attention of Mr. S. will be drawn to the subject, and that in your next number, he will, as addenda to his communication, detail his management of manures, and the mode by which it is prepared for a crop so early sown as that to which it is given.

R.

HEN'S EGGS.

From the Farmer's Cabinet.

I notice in the Farmers' Cabinet for 4th mo. last, p. 275, an inquiry as to the truth of the assertion, that hen's eggs which are *round* produce female chickens, and those which are *long* or *pointed*, produce males.

When a boy, I was in a situation to be able to indulge my fondness for fowls, and often raised chickens;—without ever having heard of the above facts, I discovered that the eggs which approached the nearest to roundness always produced females, and those which were pointed at one end always produced males—I acted accordingly, and always succeeded in obtaining females or males, according as I wished.

After a lapse of a number of years, being in Philadelphia market, I happened to mention the fact to one who raised chickens for sale, and who preferred the males, because they grew larger—the information was received with some surprise; but I advised the person to try it, and afterwards was informed of the entire success of the experiment, all males being produced by selecting the long or pointed eggs.

I since find the fact was mentioned by a writer over 2000 years ago.

I. H.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

Within the past week two new steamers have arrived from England; one in the unprecedented short passage of ten days and some hours, from Liverpool to Halifax, N. S., with dates to 4th of August. The weather had been fine, and harvest had commenced with favorable prospects of an average, but not a large crop.

These accounts have tended to depress the price of flour in our northern markets, whence large shipments of grain and flour were in progress. Cargoes of rye are now sent to the Mediterranean, whence we derived large supplies during the last few years.

The very short crop of wheat in Virginia causes prices not only to be supported, but to advance; and they now range from 100 to 120 cents per bushel; prime quality is scarce, and indeed the supply of all sorts less than usual. The deficiency is believed to exist in all the Atlantic states, except on their western borders. Flour may be quoted \$5½ to 5¾. Corn 45 to 50 cents. Tobacco has not varied much in price—ranging from \$3¾ to \$11—the demand good. The inspections in

Virginia will be about 55000 hhd. ; the largest for many years. A great number of vessels are now loading for all parts of Europe, and the warehouses will soon be nearly emptied.

Exchange on New York continues at 3 to 3½ prem.: and on England 9½ to 10. X.

August 24, 1840.

WHEAT AFTER OATS.

From the Lexington (Va.) Gazette.

In preparing the ground for this crop, many farmers are in the practice of turning down the stubble as soon as the oat crop is taken off, with the view, as they say, that the oats left on the ground may vegetate, and be ploughed under for the wheat crop. I have tried this plan several times, and in no instance have I succeeded well. My wheat was always too light on the ground, and in one or two instances (the winter being mild) the crop was mixed with oats. The most successful method with me, and one by which I have never failed of a full crop, is this: If the season is dry, immediately after harvest, harrow down your stubble that all the seed may come in contact with the ground—but if late the harrowing may be dispensed with—then turn in stock enough to eat it close and glean it well. Sheep and hogs are preferable, but cattle and horses

may be added if necessary, though heavy stock should be kept off in wet weather. The equinoctial rains of September seldom fail to vegetate any grain that may be left by the stock. About the first week in October plough your land as deep as you can, taking care to cover every thing that may be on the surface, and then sow and harrow your wheat, first in the direction of the furrows and afterwards across them.

It may be asked, why is this mode preferable to the usual practice. I answer, because by the usual practice, which is two ploughings, the ground is made too light, and the comparatively exhausted surface soil which produced the oat crop, is thrown up to produce the crop of wheat. The consequence is that much of the wheat fails. On the contrary, if the oat stubble be ploughed but once, the surface soil which had produced the oat crop is thrown under, and the vegetable matter which was turned under by the spring ploughing, is again thrown up in the very best state for the wheat crop. There is too, obviously, a great saving of labor.

These views are founded on my own experience and observation. If you think others may be benefited by them, you may give them a place in your farmers' department.

JOHN RUFF.

P. S. As oat land is apt to be too mellow, it ought to be left with more clods on it than any other preparation.

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No. 9.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

NEW PRACTICES. CLOVER AFTER CORN. CLEARING LAND BY BELTING.

By the Editor.

The rotation of crops now practised on Bonaccord, (in Prince George county,) the farm of Mr. James B. Cocke, and which has been in use for several years, is novel and peculiar. It is, 1st year, wheat, (on clover fallow,) 2d, corn, 3d and 4th, clover. The clover seed is sown in December, January or February, on the corn ground of the previous season, and without any preparatory or succeeding process to aid the covering of the seeds. Care only is used to sow when the earth freezes at night and thaws in the day, which changes alone serve, as Mr. Cocke thinks, to set the seeds enough in the earth. He thinks that he is as sure of a good "stand" and growth of clover in this way, as in the usual manner, after wheat. As the practice is new, and I had formerly made a large experiment of clover sowing on the last year's corn land without success, I was the more interested and inquisitive about the results here. My trial was induced by the desire to make the same change of the order of the rotation that Mr. Cocke has effected; that is, to have the wheat crop precede, instead of succeeding the corn. But in my trial, the growth of natural grasses was ahead of the clover, and rendered the attempt to raise the latter abortive. There is no question, from what I saw, that Mr. Cocke has succeeded in his practice, to a degree which I had supposed (from my single large trial) to be hopeless, in general. But still there must be some loss of seed, from want of suitable preparation, or of plants afterwards smothered by the annual weeds which cover the land the summer after the corn crop. In one field, which had been in corn in 1838, and sown in clover the winter after, a part was followed by wheat, and sown in clover also at the same time and in the same manner as all the other land which had been in corn only. The whole field has now a very good and well-set crop of clover; but the part which was sown on wheat is obviously thicker, and more free from weeds than the adjoining parts which had been in corn only. This field, however, it should be observed, is of land cleared within the last eight years, and therefore not yet infested with perennial, or biennial root weeds, or grasses, which would more oppose this mode of growing clover than mere annuals, although standing thickly, and six feet high, as are most of the stalks of hog-weed which generally cover this field. On other old and long-cleared fields of the farm, where the seed had been sown in the same way, upon corn land, the stand of clover is not so good as on the newer land.

If, by any means, clover could be successfully made to succeed corn, for the purpose of preceding wheat, it would be a most valuable improvement, on even the best of our existing rotations. And I had formerly aimed to secure that end, not only by the trial, above referred to, of winter or spring sowing, but also among the growing corn, in June,

and of which some of the partial success, and more general failures, were reported in a previous volume of this journal. Root grasses, (especially wire-grass,) and summer insects, are the great obstacles to this summer sowing. But when the clover is not obstructed by the first, and is able to withstand the last, the crop has complete possession of the ground, and is in perfection in the next succeeding year, instead of a year later, as it would be delayed if sown the spring after, whether on wheat, or on the corn land without wheat, as on Mr. Cocke's plan.

It is very certain that the cover of the growth of wheat is not needed to protect the young clover sown on the same land, as was the former general opinion. On the contrary, this cover serves to keep back and to enfeeble the early growth of the clover very materially. According to the general practice in this part of the country, corn is cut up in October, and put in "shocks," or stacks, on the field where it grew, for the purpose of sowing wheat on the same. Either there is no wheat sown on the spots thus covered by the stacks, or the plants perish if the cornstalks are not removed very early in winter. After being removed as usual, and these spots left bare, the sowing of clover seed soon after covers all the field alike; and at wheat harvest, it will be seen that the clover sown on these naked spots is very far superior in growth and vigor to that of all the remainder of the field, under the cover of the crop of wheat. But then the spots were clear of all other vegetation, when the clover seed was sown.

Among the many curious and remarkable facts in regard to natural successions of plants, it is well worthy of observation that, when wheat follows corn, as is usual in this part of the country, the almost exclusive natural growth which follows the wheat, and soon covers the land, is of carrot weed. But if wheat is not sown after the corn, as general a growth of hog-weed follows instead. Thus, in the one case, the young clover of the first year is overshadowed by one of those large and luxuriant annuals, and in the other case by the other; and yet neither of them is to be found, in any quantity, the year after.

A new practice, or rather the late resumption of an old and universally abandoned practice, in my old neighborhood, is the bringing of wood-land into cultivation, by killing the trees by "belting," instead of cutting down and removing or burning up the whole. I first renewed this long abandoned and very slovenly operation, on Coggins Point farm; and of this labor (or neglect) the decaying monuments, in dead and naked trunks, still remain on, and serve to deform, a large proportion of the newest land. As I had all the discredit, and bore the ridicule and reproach, of recommencing this old slovenly mode of clearing of the first settlers, I may be permitted to claim some credit, on the ground of the present extension and general approval of the practice. It is only to be commended, or even excused, where the value of the trees standing on the wood-land (whether for sale, or for farm uses,) would not pay for their entire

removal; and it is only in connexion with marling, that this, or any other mode of bringing poor wood-land into cultivation, is advisable, or will return any profit.

The benefits of this practice are most striking in regard to lands formerly cultivated and exhausted, and afterwards left to be covered by a second growth of pines, of say 30 or more years old, and from six to twelve inches in diameter. There is plenty of such land in every part of lower Virginia; and as long as the heretofore and still usual exhausting system of tillage is pursued, (without marling,) there is no likelihood of there not being a still increasing succession of such secondary growths. The proprietors, as a matter of course, would cut down and clear such land. The wood ("old-field pine") was worthless for any purpose, and was burned on the ground, with much difficulty. The thick cover of pine leaves, the dropping of several previous years, being known to be hurtful to the growth of crops, was carefully raked up and burnt, to get rid of it. No one thought of using this litter as manure for other ground. The land, thus effectually cleaned, was then cultivated in corn; and after two or three years of better production, it was reduced to its former state of exhaustion.

Such was the former mode in Prince George of bringing "pine old fields" into cultivation; and such is still the practice in many places where marling has not yet been introduced. The opposite mode, as practised by myself, and which is either fully or partially conformed to now by all persons similarly situated, was, to marl the land first, (merely opening narrow passages for the carts to drop the loads,) spread the marl carefully and equally on the litter; next cut down all pines under 6 or 8 inches through, and belt all above that size, by merely cutting through the bark effectually. Any other and smaller growth than pines (of which, of course there would be but little) would have been previously grubbed up. August, both as a leisure time, and for other reasons, was the best time for all these operations; and pines then and thus slightly cut around will not begin to die until the latter part of the next year. In the spring thereafter all will be dead, and the land ready to yield its first crop. Not only the previous deposit of dead leaves will then have been converted to manure, by combination with the marl, and in a great degree fixed in the land, but two subsequent crops of leaves will have been furnished to increase this improvement. In addition, the gradual decay and dropping of first the smaller, and next the larger boughs, and finally of the trunks, all go to give manure to the land. The injury to crops, and obstruction to tillage, caused by the fall of branches and of trunks, will not be considerable during the two first crops; and if the land is then rested for two years, during that time most of the wood will fall without doing harm. The subsequent cutting up and removal (or burning on the ground) of the fallen trunks will indeed be a considerable labor; but not to be compared to a general clearing, by cutting down and heaping and burning, at first. So different in cost are the first year's operations, that fifty acres may be brought under tillage by belting, as quickly and as easily as five acres by cutting down.

A less profitable course than the above described is more usual; that is, the land is generally not

marled until after the trees are dead, and the land about to be cultivated. This is an enormous waste of the vegetable material for fertilization. A much better mode than even the preceding would be to marl the land as many years in advance of the belting and cultivation, as the proprietor could afford to wait for the return of the accumulated value. Then the manure crop, (the pine trees) would continue to grow, and every year to give, in the successive deposits of leaves, new coverings of manure, and the marl would regularly combine with and store up the products, and fix them in the soil, instead of all being successively and regularly wasted, as is the case without the marl. I have no experience of such long advanced investments of capital in improvement, and therefore can but state *opinions*, instead of *facts*. But I entertain but little doubt that such a process, if allowed 12 years between a good and equally spread marling, and the after belting and cultivation, would raise to a permanent production of 10 barrels of corn per acre, land which could not long continue to yield two barrels, if tilled, without marling or belting.

BURNING COAL MINES.

From the Mining Journal.

In our last number we gave extracts from letters received of the progressive conflagration of the coal mines in the department of the Allier, which, since the year 1816, had not been subjected to so direful a result as that embodied in the following description, extracted from the *Athenæum*. The late accounts, however, state that considerable progress was being made in turning the waters of the river Gange into the workings, and thus stopping the progress of destruction. The loss, however, must, in any case, be considerable:

"Letters and papers from the department of the Allier, bring accounts of a remarkable conflagration which lately broke out in the coal mines of Commentry, and had been burning for a week with daily increasing fury. It appears that this fire, which, for the last twenty-four years, has been silently smouldering in the bowels of the earth—revealing its existence by perpetual smoke and occasional outbreaks of flame, which, however had always been confined within the limits abandoned to its dominion—had, at length, made its way through some breach into one of the vast galleries of these extensive workings; and there, meeting with the air-current so long denied it, had spread through all the subterranean chambers and passages with a rapidity before which resistance became utterly powerless, showing itself at every crevice and outlet of the vast labyrinth, and flinging its points and columns of fire far up into the air, through all the shafts that led into the wide field of the rich deposit. Luckily the solemnities of the day, it being Sunday, had emptied the workings of their human tenants, for no mortal aid could have availed them against the suddenness with which the fiery flood swept over all things. The authorities of the district were early on the spot, but have hitherto been little more than idle and awe-struck spectators. Neither Vesuvius, nor any other eruption, say the accounts, can give a notion of the dreadful and sublime

scene. 'If,' says one writer, 'it were possible to forget that the flames have been, for three whole days, devouring immense wealth, and that by this conflagration 300 fathers of families will be thrown out of employment, there would be room for no other sentiment than that of admiration at the magnificent spectacle. Imagine a deep ravine, nearly circular, in the form of a reversed cone, with its edges, however, hourly enlarging. Through fourteen large openings, issuing at about twenty feet above the ground of this ravine, and giving access to the innumerable galleries of the mines below, as many torrents of flame are poured forth, with frightful violence from the caldrons within—flames of a thousand hues rushing forth like fiery whirlwinds—dividing, and crossing, and mingling, and rising, and falling, and rising again! At times, a hollow cracking sound echoes through the abyss; this is some huge block of coal detaching itself from the roof or sides of one of the galleries, and falling into the blazing gulf. Then rises up a thick column of black dust, till it reaches the openings of the galleries, where, pierced in all directions by the flames, long serpents of fire work through its volume from side to side.—Sixty feet higher up, on each side of the galleries, two gaping mouths shoot into the air their dazzling columns of fire. Suddenly one of these ceases. It seems for a moment as if checked in its wrath. Then comes a long and startling groan from the entrails of the earth; and forth again rushes the flame, blood-red, roaring and terrible, threatening in its fury to lift up the burning mountain altogether, and bury the spectators beneath its dreadful ruins. Again, look around you; it is midnight, and 2000 human faces are there, some grouped on the opposite crest of the ravine, and some sheltered in the cavities of the rocks. Yet no sound meets the ear, save that of the roaring flames.' The latest accounts state that the rafters of the galleries had all fallen, and the founts of flame nearly ceased to play. The whole had become one huge burning gulf. The loss is said to be incalculable; millions of hectolitres of coal had been consumed. The engineers were preparing to turn the course of a stream, which flows at a league's distance, and direct it upon the burning mountain. Workmen were employed night and day in the operation, by which it was hoped to lay the mines under water."

A later account states "that the river flowed 38 metres beneath the coal-field. A minute survey of the ground was, however, made, and established the possibility of turning the course of a tributary stream, which flowed at a distance of 4,300 metres. The work was instantly commenced; the ground-formations for the bed of the deviation occupied 48 hours; and twice that interval of time sufficed to execute and arrange in their places certain wooden conduits; destined to traverse several intervening hollows. At length the waters so impatiently expected arrived, pouring into the burning mine 2,000 cubic metres of water per day. At the present moment, all the subterranean works are under water; and since the commencement of this month a system of irrigation has been established on the burning mines, which has produced the happiest effects. Hopes are entertained that, in time, not only will the immediate conflagration be extinguished, but that also which has been in operation for 24 years past."

CULTIVATION OF PEAS.

From the Yankee Farmer.

There are probably but few crops that more amply remunerate the grower for the cost of cultivation, when rightly managed, than peas. They constitute a most excellent and nutritious food for hogs, and as they may be raised on almost any soil that is moderately fine and dry, they are justly preferred by many of our most judicious and enlightened agriculturists, to meal or corn.

Land naturally abounding in *red sorrel*, even if it has been rendered sterile and unproductive, by long and excessive cropping, will generally, if subjected to a cleansing crop the year previous, produce good peas.

I have upwards of an acre of "*marrowfat*" now growing on a soil of this description, and which, judging from present appearances, will yield a heavier net income than any other piece of similar dimensions, on the farm; many of the vines having already attained the *length of four feet*, and presenting in their innumerable *peas and blows*, the most promising indications of an abundant 'yield.'

I ploughed the first of May, and sowed (about *three and a quarter bushels to the acre*,*) ON THE FURROW: The ground was thoroughly and carefully harrowed with a light two horse harrow, and the surface smoothed with a "*Drag Roller*,"—an implement by the way, of such essential utility that no farmer should, according to my view, be without one, and which any person possessing the most ordinary attributes of "*constructive genius*," may furnish, in a few hours, for himself.

Some farmers prefer *drilling* their peas. This system is indubitably a good one, but will be found, I think by many, and especially by those who are scant of "*helps*," to involve many and serious inconveniences from which the more ordinary and expeditious method of *broad cast sowing*, is exempt.

I have known an excellent crop to be obtained, by simply depositing a few peas—say six or eight, in a hill with potatoes. They are no detriment either to the growth or cultivation of the latter, as they require a specific nutriment, which they are enabled to obtain without infringing in the slightest degree upon the *pabulum* specifically appropriated to the potato. The fact is now, I believe, generally recognised by all judicious farmers, that *leguminous plants derive but an inconsiderable proportion of their nutriment from the soil*—a fact which is amply and incontrovertibly established by the circumstance of their growing and flourishing in full vigor, for weeks after the *pedicle* or *root-stalk* has become dry for several inches above the surface of the soil, and consequently incapacitated either to imbibe or transmit moisture in sufficient quantity for the growth and sustenance of the plant.

* Many will doubtless regard this as an error; but in my opinion the practice of sowing one and two, and sometimes two and a half bushels to the acre, which has generally prevailed among us, is the radical and efficient cause of failure in the cultivation of peas. I have made several experiments in order to ascertain the *right quality*, and have invariably succeeded best when I have been liberal of my seed. The smaller the size of the pea, the smaller of course will be the quantity required.

By practising this system, several objects of essential importance with farmers are obtained. *First, purity of seed*—a very important consideration with the *neat farmer*, certainly; and, secondly, *cheapness of cultivation*, which under present exigencies, is of no less importance, probably, than the first. More on this topic anon.

EXPERIMENTALIST.

IMPORTANT—EASTERN LANDS.

From the Philadelphia Saturday Courier.

Judge Story recently pronounced a decision in Portland, setting aside a speculative purchase in eastern land, on the ground of a mistake of its value, by the purchaser. The opinion is highly important, as affecting a great many contracts.

There probably has never been, in any country, a more ridiculous farce than was the *wild speculations* in eastern timber-lands, in the years 1833, '4 and '5. In the very eastern portion of Maine, there are millions of acres of land unsubdued. All of a sudden, nobody knows for why, or for wherefore, people got the idea into their heads that those lands were covered with nearly *all* the pine timber there was in the states, and of consequence, purchasers would find themselves compelled ultimately to seek that region for all their supplies. Previously, the price of many of these lands had been as low as twenty-five cents per acre. But maps were drawn of townships, in which the artists were instructed to put plenty of rivers and good water privileges; and above all, to estimate the pine timber very abundant. It was wonderful with what facility they accomplished this task. Townships, where previously only now and then a pine tree could be found, were covered over with ten millions of feet of pine timber to the acre as rapidly and easily as the draftsman could draw the map! It was a sort of magical process—but it never failed to be accomplished for any township, which was for sale—and at the prices to which they soon rose, viz: \$6 a \$15 per acre, nobody thought of holding on.

Without making a long story of it (which certainly would not be interesting to those who were used up in these wild speculations,) we will say, in a few words that thousands of people in Maine, Massachusetts, Vermont, Connecticut, New-Hampshire, New-York, and from almost all other parts of the union, and not a few from England—were ruined by their attempts to get rich in a day, by investing all they had, and promising to pay ten times as much more for townships and portions of wild land, in and about the region of the Penobscot river, and the Great Lakes, in the State of Maine. The business portion of the city of Portland—one of the finest in the world—was almost destroyed by these speculative operations. And scarcely a town in Maine or Massachusetts escaped their destructive influence. Years will not restore the injury which these wicked speculations produced. They gave people such ridiculous notions as to what they supposed they had made, that they run into all sorts of extravagance, and thus set the most destructive examples to the honesty of trade and industry around them. They broke up men in their regular business, prostrated their business-habits, and set them to lounging about society, living by getting more in debt, in-

stead of working to earn something for themselves—a course which is always to be deplored as of incalculable injury to society.

It has been estimated by a careful business mind, that if what people thought they had made in the eastern land speculations, could have been "realized," not less than one hundred million of dollars would have come out of them! But what a short dream of wealth it was! In a few months the imaginary wealth had departed, and not a man was worth as much as he would have been, if no speculations had existed. They held each other's notes—but what of that! Nobody could pay. You might as well expect to get pay for moonshine. And, to our judgment, Judge Story has performed not only a just judicial task, but a very equitable one, in setting out a decision by which all these false sales can be put aside.

But we must not leave this subject without drawing from it an instructive lesson. We live to learn. The experience of thousands in the eastern land speculations was perfectly paralyzing at the time—but let them think of it only as a guide to all future operations, remembering that there is but one sure way either to wealth or reputation, viz: by the practice of unceasing industry, economy, virtue, intelligence, and uprightness. All speculations are absolutely injurious to any community in which they may occur, in the long run, for a speculator does not add a penny, but abstracts dollars from the wealth of society—and what is equally deleterious, he destroys the straightforward and moral business habits, as far as his operations exert any influence. Society is alone interested in the proper support of correct business men, industrious mechanics, and good agriculturists. *We are uncompromising opponents to all speculators.*

BLUE GRASS, WIRE GRASS, &c.

To the Editor of the Farmers' Register.

Surry County, September 1, 1840.

I would be pleased to be informed through the Register, whether it would be advisable to sow blue grass on our marled lands, with the view of smothering or destroying that great pest, wire grass. Would it not be swapping the devil for a witch? Wire grass follows our marling operations so prompt and certain on light soils, that sometimes I am almost in doubt which would be the wiser plan, to marl the land, and have it improved and well set in wire grass, or have it not marled and poor, without the grass. With the same labor we cannot cultivate as much land by one third as we could a few years ago. I have never seen a field well set in blue grass, and therefore know but very little about it; but I cannot think that it can be worse, or even as bad to cultivate, as one set with wire grass.

We are making a desperate effort to improve our stock of hogs. There have been a good many Berkshire pigs introduced into the county, which are decidedly superior to any thing of the swine species that I have ever seen. There is one (which was farrowed in the county, and raised with Virginia management,) that weighed 117 pounds at four months of age; and I have heard

that Mr. Spratley has a pig, sired by a Berkshire, and out of a half Jersey big bone and Chinese sow, that weighed 150 pounds at the same age. We also have a cross between the Berkshire and Chinese, which are very fine, far superior to the genuine Chinese, and, in the opinion of some, equal to the Berkshires themselves.

I understand preparations are being made to transmit to you the number of persons engaged in marling in this county, their success, &c. Our crop of apple brandy is exceedingly short, and as for peach, I believe there is none made at all; if there has been, I have neither seen nor heard of it.

A FARMER.

We infer that the first question of our correspondent is founded on the several recommendatory notices of Kentucky blue grass, which have appeared in the Farmers' Register, extracted from western agricultural papers, and more of which will follow in this number. The popular nomenclature of grasses is so confused and contradictory, that it is very uncertain what is meant by any name used in a different region from our own. But we believe that what is called "blue grass," in Kentucky and Tennessee, is not the abominable weed which we know by that name on our rich and stiff corn fields and wheat fallows, (though a valuable pasture grass); but is what is here called *greensward*, and sometimes *goose-grass*. We shall be pleased to have our readers instructed in this respect, by either of our subscribers, Judge Kennedy of Tennessee, or Thomas B. Stevenson, esq. of Kentucky, both of whom are well informed on the subject.

There is still another grass, better known in lower Virginia under the name of blue grass. This is a luxuriant and valuable wet meadow grass, having long broad leaves, in part tinged with purple.

BARK BREAD IN NORWAY.

From Laing's Norway.

Many pines were standing with all their branches dead, stripped of the bark to make bread, and blanched by the weather, resembling white marble,—mere ghosts of trees. The bread is made of the inner rind next to the wood, taken off in flakes like a sheet of foolscap paper, and is steeped or washed in warm water to clear off its astringent principle. It is then hung across a rope to dry in the sun, and looks exactly like sheets of parchment. When dry, it is pounded into small pieces, mixed with corn, and ground into meal on the hand-mill or quern. It is much more generally used than I supposed. There are districts in which the forests suffered very considerable damage in the years 1812 and 1814, when bad crops and the war then raging, reduced many to bark bread. The extended cultivation of the potato since that period has probably placed the inhabi-

itants of the lower country beyond the necessity of generally resorting to it; but the 'Fjelde' border uses it more or less every year; nor is there any good reason for supposing it unwholesome, if well prepared; but it is very costly. The value of the tree, which is left to perish on its root, would buy a sack of flour, if the English market were open. They starve, and we shiver in our wretched dwellings, although each country has the means of relieving the other with advantage to itself.—

BLUE GRASS.

Reply to inquiries concerning the quality and preparation of blue grass lands, time of sowing seed, etc.

From the Southern Cultivator.

Sir—Having had my attention directed to the inquiries of Dr. Douglass, of Hickman county, in the last No. of the Cultivator, and having some years of successful experiment in the culture of blue grass, I would respectfully communicate such facts as I have in my possession, and the conclusions they have led me to in regard to the same.

In February, 1838, I sowed 70 acres of woodland in blue grass seed, at the rate of $\frac{3}{4}$ bushel of blue grass seed and $\frac{1}{2}$ timothy seed to the acre. Previous to sowing, I cut down all the undergrowth and smaller trees leaving the tops piled upon the ground, and raked up and burnt the leaves, clean. When sown, I turned my stock in to trample it in; which they did effectually, in browsing about after the green brush. So soon as the seed began to vegetate, I turned the stock off it, and suffered nothing to run upon it till the grass went to seed again. From this sowing I obtained a fine stand of grass.

The same season, I sowed upon open ground, with the same seed, and failed to get any thing like a good stand. I am satisfied the grass after germination was killed by exposure to the summer sun.

In February, 1839, I sowed 40 acres in woodland prepared and managed in the same way; with the exception that the quantities of timothy and blue grass seed were equal, and obtained a very excellent stand of grass. At the same time, I again sowed in open ground, out of the same lot of seed, and it again resulted in an entire failure. My land is a fair specimen of the rich limestone soils of Maury county, and is such as is believed best adapted to blue grass. From my own and the experience of others, I am satisfied that fall sowing is not to be recommended in this climate. Our long and late droughts in the fall; which are so frequent, render it extremely difficult to get a stand of grass from seed sown at that season.

From the facts stated above, and others I might mention of a similar character, I am driven to the conclusion that thinly timbered woodland, in this latitude, is preferable for blue grass to open land, on account of the greater certainty of a stand, with this remark, however, that where a stand can be obtained on open ground, the grass is doubtless sweeter and more nutritious, on account of the full exposure to the sun. And I would here suggest it as my opinion, that timothy sown with blue

grass at the rate of one half bushel of timothy seed in the chaff and one half bushel of blue grass seed to the acre, adds greatly to the chances of procuring a good stand upon open ground, from the fact that the timothy springs up soon and affords a shelter to the young blue grass, protecting it from the intense heat of the sun. The blue grass will take the timothy in the course of two years. Neither the timothy or blue grass seed require ploughed ground; but both do better on an unploughed surface. Wet seasons are favorable to grass sown on open ground.

I would recommend sowing in January or February—because there is at that season always moisture enough in the ground to germinate the seed. I would advise having the ground clear of leaves at all hazards, that the seed may come in contact with the surface of the soil. Some farmers scatter shattered corn over the ground after sowing blue grass, and turn their swine in, which in searching after the corn, effectually trample the seed in. This is doubtless an advisable plan. For the same reason, I leave the green brush of the cleared timber on the ground, and turn my cattle in. It is highly important to take the cattle off, so soon as vegetation begins.

Dr. Douglass does not say whether or not he took the requisite pains to have the seed trampled in. But as he states that they were "foreign seed," I am very much inclined to think with him that his failure is to be attributed to the use of old and injured seed. It is certainly the best plan, when practicable, to buy of a neighbor known to be a gentleman, or when once getting a start, to make your own seed.

Very respectfully,

EVAN YOUNG.

Maury county, Aug. 6, 1840.

BLUE GRASS.—ITS CULTURE.

From the Southern Cultivator.

Mr. Editor:—Perhaps I should have waited for some farmer of more learning and experience to answer Dr. Douglass' inquiries on the all important subject of sowing blue grass—but as I have had some considerable practice, I shall proceed to give him the benefit of it. Though at the same time, if any other farmers should offer theirs you may lay mine aside if you think proper, without any injury to my feelings.

On my first attempt at blue grass, I sowed the last day of September, in woodland on the ground in its natural state, only removing the greater part of the logs and under brush. The leaves had just begun to fall, which put my seed completely on the soil. I then turned all the stock that I could raise upon it, and kept them upon it some six weeks; after which I let very little stock upon it till after harvest the next year. I then grazed it off close. Even then my grass made but little show; but the next spring I kept the stock off from Christmas until the seed ripened. I then turned on all my stock, grazed it off close, and it being very dry, that was not hard to do. In the course of five or six weeks there came a rain, and I took off the stock and in a few days my blue grass assumed the appearance of an cat's patch in the spring. I

let it go to seed the second year for the purpose of saving seed.

Last year I sowed an old lot with blue grass and rye. It set in very dry. Though a great deal of the seed sprouted, and some of it came up, I thought it was entirely lost; and I pastured it all the winter and spring. To my great surprise, this fall, I find at least a sufficient stand. By letting it go to seed one year, there will be plenty.

I also sowed some of my own raising last winter in woodland, rough, and a great many leaves on the ground. I put the seed down in January; then turned in all my hogs and scattered over the ground shattered corn, which made my hogs root it in nicely. This lot also made a good stand of grass.

One of my neighbors sowed in March last year; he cleared the ground nicely of leaves and litter, and I think he got a more regular set at first than mine did, owing to the leaves, as I have discovered that in spots where the ground was entirely naked the seed vegetated much sooner.

At my first sowing there was a spot of seven acres off of which I did not cut the saplings the first year, and I found no grass there. The next winter, I took them off, and there is now a good set without more sowing. So my experience teaches that if you put seed on the ground of a good quality, you will have some grass under any circumstances.

But care should be taken not to pasture much until it goes to seed once; even then, it is worth a great deal more to let it get up well in the spring. From what I have stated, it may be inferred that I look upon good seed as being a most important matter. In truth, I for one am disposed to believe that Dr. Douglass had bad seed.—As he has been unfortunate, I will try next year to save seed, and if he will send, I will try to let him have some that I will insure to come up.

JAMES JONES.

Maury county, Aug. 7, 1840.

A NEW AND EFFECTUAL METHOD TO KYANISE TIMBER.

From the Observer.

Within the last two or three weeks the Manchester and Birmingham Railway Company have commenced Kyanising their wood sleepers in a much more quick and effectual manner than by the old mode of simply depositing the timber immersed in the prepared liquid. The company have had made a large iron cylindrical vessel, weighing about ten tons, and which is about thirty feet long, and six or seven feet diameter, made from wrought iron plates, five-eighths thick, and double riveted, which vessel is capable of resisting a pressure of 250 lbs. on the inch. The vessel being filled as compactly as possible with wood sleepers, twelve inches broad and seven inches thick, the liquid is then forced in with one of Bramah's hydraulic pumps, and worked by six men to a pressure of 170 lbs. on the inch. By this means the timber is completely saturated throughout in about ten hours, which operation, on the old system, took some months to effect.

REPORT ON PROFESSOR SHEPARD'S ANALYSIS OF THE SOILS OF EDISTO ISLAND.

"Resolved, That the communication of Professor Shepard be referred to the Special Committee on Soils, with instructions to report, how far the analytical information it discloses, agrees or conflicts with the practice of the Planters of the Island, as exhibited in the application of their manures."

The committee to whom was referred the above resolution, beg leave to report,

That the following table exhibits, in one view, the various properties of the soils* subjected to analysis.

Pure Sand	K	I	H	G	F	E	D	C	B	A	When dried.
											WATER OF ABSORPTION.
										Lost	
										2.87	
										2.83	
										2.66	
										1.66	
										2.83	
										2.36	
										11.36	
										14	
										2.66	Organic Matter.
										3.83	
										3.82	
										3.05	
										2.93	
										3.25	
										2.41	
										8.15	
										480.	
										605.	
235.											Increase in weight after being thoroughly drenched in water.
										14.0 of water.	
										92.57	
										91.64	
										94.00	
										95.00	
										93.00	
										93.23	
										1.70	
										1.70	
										0.94	
										0.79	
										0.81	
										1.05	
										5.03	
										6.16	
										4.66	
										3.41	
										4.99	
										4.77	
										0.70	
										0.50	
										0.50	
										1.20	
										0.35	
										0.29	
										.20	
										5.80	
										0.60	

* Although the samples were taken from one plantation, yet it is believed that they afford fair specimens of the soils of the Island, except those which

With regard to the cotton crop, F is the poorest in production; H, the best. The former, whose capacity for water is the least, is distinguished by the smallest quantity of organic matter; the latter contains comparatively a large amount of carbonate of lime. The following is the relative order of the soils in reference to fertility: H, C, G, E, D, F. Further information, concerning the question propounded by the society, will be furnished in the sequel of these remarks.

The interesting inquiry in relation to the food of plants, is still unanswered. The earliest theory on this subject, emanating too from practical men, was in favor of decomposed organic substances. Whilst one, skilled in the science of vegetable physiology, pronounced water, another oil, and a third pulverized earth, as the great desideratum. Dr. Priestley insisted on phlogiston, and Kirwan on charcoal, as the true aliment. The elements of vegetables are few and very similar. The most essential are oxygen, carbon and hydrogen. The various combinations of these elements make up the varieties of the vegetable kingdom. In like manner, the general soil consists of few elements; of which siliceous sand, alumina or clay, and lime, carbonic acid, nitric acid, sulphuric acid, and iron, are the chief earths, acids and minerals. These substances, which are united in various degrees, produce the numerous modifications that characterize soils possessing the same constituent principles. The atmosphere, it is well known, is composed of the two gases, oxygen and azotic or nitrogen. Whilst plants, which derive nourishment, as well from the air by inhalation of their leaves, as from the earth by absorption, excrementitiously throw off the oxygen, which is necessary to animal life, they render the nitrogen fit for respirable air by decomposition: thus contributing by a two-fold operation to the perpetuation of every created thing with which the earth abounds. Modern writers seem to concur in the belief that, although plants need a variety of soils, adapted to their constitutions, they perhaps require no specific nourishment, each species being endowed with the capacity of converting food to the sustaining of life; in other words, that substances of every description, whether solid, fluid or gaseous—that light, caloric, gravitation, attraction—all were designed as necessary agents in the formation of the great family of vegetation. It is nevertheless true, that the primitive earths in their pure state, or when mixed in proper portions, are barren;* further, that the living fibre is composed of what was originally living fibres—and that in decomposed animal and vegetable matter every constituent is embraced which theorists have successively maintained is the food of plants. Be this as it may, it is certain that for any substance to constitute aliment it must exist in a soluble state, to be reduced to which, air and moisture are indispensable. Hence, by breaking up and frequently stirring the ground, the great object of tillage is effected. But these natural agents are alone incapable of converting

produce "blue cotton." A, B, I, K, were mud samples.

* See experiments of Giobert. Loudon's En. of Gard.

† "All animal substances are resolvable into hydrogen, nitrogen, oxygen, carbon, phosphorus and sulphur. Dung, or the mixture of animal and vegetable matter, contains all these."

all the insoluble matter of a soil into geine.* To accomplish this purpose, the aid of artificial stimuli is necessary.

The soils of the Sea Islands are alluvial, or the result of the deposition from rivers. The productiveness of alluvium is ascribable to the finely divided matter of which it is composed. By freely admitting air and moisture, geine, which the Massachusetts chemist maintains is the pabulum of plants, is quickly produced. The ready solubility of organic substances in a sandy soil, from the cause already assigned, is the reason why manures have so speedy an effect; at the same time it accounts for their evanescent character. Chemical tests, however, are not always infallible guides for the cultivator. To perfect the work in which science invites him to engage, minute examinations on his part are clearly called for. Successful tillage is influenced materially by the depth of the mould or crust of the earth, and the nature of the subsoil. The cotton plant has a long tap-root, which penetrates always, unless a very wet season, or some obstacle intervenes, below the soil.

It requires no argument to show that, if the product of a crop mainly depends on the quantity of food with which it is supplied, the deeper the mould, the great laboratory of nourishment, the more abundant will be the harvest. Again, two soils may agree in every material point in their elementary parts, yet, in production, will be very dissimilar. The difference is traceable to the subsoil. By the influence of an absorbent, clayey substratum, sandy lands are rendered prolific, whilst without this mechanical assistance they might have remained in comparative sterility. So, the fertility of a clay soil, obviously too retentive of moisture, may be owing to the sand or gravel on which it stands. The soils which are of a good depth, and rest on a clay foundation, are decidedly preferred for the cotton crop. The black, or flat dark gray lands, as they are generally wanting in one or both of these important agents, cannot be relied upon. This is probably the true explanation why F and D, under no system of management, have yet repaid the labors of the cultivator. Distinguished as H is in both of these valuable properties of the best cotton lands, its superiority is at once in part accounted for. In fine, it would not be hazarding much to say, that production, so far as the principle of mechanical agency is involved, depends as much on depth of soil, and the nature of its substratum, as upon the proper admixture of the earthy parts of the soils themselves.

The samples analyzed are described as being uniformly sandy, containing in one hundred grains over ninety-one parts of silica. Although in them there are only "feeble traces" of the carbonate of lime and of the sulphate of lime, yet, it must be remembered, that a small fraction only of

*"Geine is the decomposed organic matter of the soil. It results chiefly from vegetable decomposition. Geine is either soluble or insoluble. The latter is converted into the former by the action of lime. Acting neither as an acid nor alkali, it is converted into a substance having acid properties by the action of alkali, and in this state combines with earths, alkalies, and oxides, forming neutral salts, which may be termed geates. Soluble geine is the food of plants."—*New Method of analyzing Soils, by Dr. Sam. L. Dana, of Lowell.*

either enters into the composition of plants; and that "a crop may fail from the want of a single grain in a hundred of those elements."* The amount of organic matter is small, though not remarkably so, for all alluvial soils, it is believed, are wanting in this respect. The almost entire absence of calcareous earth was unexpected. In the prosecution of their duty, having been led to examine this subject, the committee find what indeed is a striking fact, that the soils of America, unlike those of Europe, are very deficient in this substance, some of the latter containing over 50 per cent. and nearly all of them a large per cent. "Out of one hundred and twenty-five specimens of soils from all parts of Massachusetts, and several of them from lime-stone regions, only seven," says Edward Hitchcock, professor of chemistry in Amherst college, "exhibited any effervescence; and even these, when analyzed, yielded but a very small per cent. of carbonate of lime." The same writer remarks, "I have recently examined five of some of the richest soils of Ohio and Illinois, and although I find calcareous matter in all of them, yet the average quantity is not over 2 per cent." A similar statement has been made respecting the soils of Virginia, and of some of the western states, even in limestone regions, by Mr. Ruffin, the able editor of the *Farmer's Register*.

"May not the peculiar fertility of new Sea Island cotton lands," asks Professor Shepard, "be owing to the proportions of comminuted shells natural to such soils, and the deterioration of these lands under long cultivation, ascribable to the exhaustion of carbonate of lime?" To the latter query the committee would answer, that chemical tests prove that in the formation of plants, as already noticed, the quantity of lime taken up is very inconsiderable. This, superadded to the acknowledged fertility of our western lands over those of Europe, is strong evidence, that the productiveness of soils does not depend upon the amount of calcareous matter, but that a small per cent. only is necessary. The committee are unable to see how any soil can be deprived of its calcareous constituent, which does not at the same time lessen the quantity of all its earthy ingredients. Lime is one of the primitive earths. It cannot, therefore, take a gaseous form, nor can its nature be changed. If there was a time when our soils contained more of the carbonate of lime than they do at present, it follows that, as lime is indestructible, it must now exist in some other state of combination than the carbonate: perhaps in that of the oxalate of lime, a powerful promoter of vegetation. If so, the exhaustion of the carbonate of lime is not one of the causes of the present deteriorated condition of the Sea Island cotton lands.

Acquainted as we now are with the main defects of our soils, the important question is presented, how are they to be amended? Before an answer is given, the committee would briefly advert to two prominent errors in our system of husbandry, under which we have long labored.

1. The keeping of large stocks. The plantations of the Sea Islands are small. About one half is cultivated annually—the remainder is allotted to the support of domestic animals. In autumn, looking only to the spontaneous production of the earth, a cheerless waste is exhibited. As bounty-

* Assertion of the late Timothy Pickering.

ful to the southern planter as nature invariably is, where overdrafts on her munificence are never made, her resources at that time become exhausted and the offal of the gathered crop furnishes the only means of conducting his stocks safely through the ordeal of winter. Accordingly, for two-thirds of the year, they furnish neither milk, butter, nor meat, for the ordinary consumption of the plantation; and at no time are they capable of profitably promoting any of the ends for which elsewhere they are so justly celebrated. Engaged as we are in the culture of one of the most valuable commodities in the world, the raising of cattle for sale is prohibited by the common dictates of prudence. For their manure and for table use alone are they considered worthy of attention. To subserve these purposes, a small number only, especially of sheep, is necessary. The pursuits of the grazier and ploughman, if in the attainment of their ends they respectively depend upon the same grounds, are in direct collision. Both cannot succeed unless at cost of labor and of time which would soon annihilate their profits. If the former prosper, is not the husbandman thereby deprived of the natural food for his plants? If the latter hope for a lucrative harvest, it can only be effected by circumscribing within very narrow limits the pasturage of the grazier. The injury sustained by the depredations of stocks, according to our present improvident plan of husbandry, may be ascertained with some precision. As a preliminary suggestion it may be remarked, that the sheep has an insatiable appetite. If not gratified, in the strong language of "Arator," he dies; if it is, he depopulates the country. Liable to numerous diseases, he has never been a lucrative object where tillage was the main support of the people. He is reared too at a much greater expense than the cow, and furnishes for the table perhaps not one-fourth of the food which is provided by that useful and hardier animal. Each head of black cattle annually keeps bare of grass, in ordinary seasons, about two acres of ground, and each head of sheep, perhaps three acres. Now as the land, where this system of unrecompensed pillage is carried on, is designed by the owner for his crop of the following year, it is fair to conclude that, as the planter is engaged with his whole force between two and three months in collecting putrescible substances to supply the place of the food which the tooth has destroyed, a large portion of that time is in effect appropriated to the support of his cattle. Were their number greatly reduced, probably only one-half of the manure which necessity now obliges us to procure, would be needed; that is, if we be satisfied with the present amount of artificial fertilizing matter—otherwise, we could duplicate the quantity now gathered. When we look at the poor and degenerated condition of our stocks, the denuded state of our pastures, and connect these with the startling truth, that, in despite of apparently well directed efforts, our lands in regard to their productive powers are stationary, if not retrograding; the conclusion is irresistibly forced upon the mind that, in furnishing the domestic circle with some of the necessities of life, a price is substantially paid equal to the joint labor of the planter and his slaves for one or two months. If an ample supply of the best meats and the comforts of the dairy be an object of importance, a small stock only will furnish it. If to add to the amount

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and improve the quality of manures be desirable, look to the same source; for English authorities, sustained by the undivided opinion of the New England farmers, assure us, that ten well fed cows produce more manure and of decidedly more enriching properties, than fifteen whose allowance has been stinted. Should a larger provision in vegetable aliment be sought for, let not the tooth and the hoof thwart the efforts of nature to aid us. From facts in the possession of the committee, and from careful observations, they are led to think, that ten head of black cattle and four of sheep to every hundred acres, would be about the true proportion for our arable lands.

2. The culture of too much land for the force employed; and, as a necessary result, insufficient manuring. It is known to the grower of cotton, that his harvests are rarely gathered from the whole crop, but only from those portions where the soil is naturally productive, or where a large amount of proper nutriment is applied. The number of acres cultivated to the hand is from three and a half to four. The usual quantity of compost manure per acre, which the unceasing labor and perseverance of the planter have as yet enabled him to furnish, is from twenty to thirty cart-loads. Is not this too meager an allowance? The substitution of quantity for fertility is indeed an exhausting operation, without a single principle to recommend it. To provide abundantly, therefore, for the wants of our soils, rather than to deprive them without reciprocation of their natural ingredients by too extended cultivation, is demanded by the weightiest considerations. The committee will not comment on the saving of labor and of time, now in a great measure unprofitably expended—or the great facility of attending a small crop—or that thereby the planter may have it in his power to adopt in part the inclosing system—or at least to allow his lean and dwarfish animals more and better food; but they will assume the impregnable position, that a given quantity of decomposed organic matter to an acre on exhausted land will yield a larger return than if the same had been placed on one and a half or two acres. The history of agriculture and of horticulture in England and America bears ample testimony to this interesting fact, and perhaps on no question in husbandry are writers so well agreed. Without bringing to the notice of the society the mass of evidence in confirmation of this proposition, concerning, however, the numerous crops that are elsewhere raised, they would at once, as having a direct relation to the object of their solicitude, state the results of only three among many trials made on this island. The last season a member of this society used on an acre of good ground eighty-four cart-loads of marsh and mud—the former greatly preponderating. From it he gathered three hundred and ten pounds of clean ginned cotton. His general crop yielded about one hundred and ten pounds per acre. In 1832, another member directed his overseer to double the usual quantity of manure for a few acres, which were marked by the usual indications of sterility. Indeed they were in appearance so extremely poor, that the cotton plant, through their agency, could scarcely be said ever to have reached the point of fructification. From some misapprehension, the orders of the owner were exceeded, and the unprecedented amount of eighty-four cart-loads of

mud and eighty-four of compost to the acre was applied. The product was not only as large as that of any other portion of his crop, but, although eight years have since elapsed, the field so bountifully assisted at that time still displays its gratitude to its cultivator by the abundance of its fruits. In 1837, one of the committee, in order to ascertain, whether an unusual quantity of compost manure was unfavorable to the production of cotton, or had any effect in bringing about a new growth in the plant, tried the following experiment. On twenty-four acres of high, sandy land, a part of which was very light, there were put about twelve hundred ox-cart-loads of well rotted substances, (of which marsh formed the principal part,) from the stable and cattle pen. These were thrown broad-cast, and the land immediately listed. The rest of the crop received of compost twenty horse-cart-loads per acre—or of mud, fifteen cart-loads—of marsh, five cart-loads. The spring was cold and wet, and from three gales of wind great injury was sustained. Early in August, all of the cotton, except the twenty-four acre field, took a second growth. That suffered in no respect, save from wind. It matured very rapidly, and the yield was over two hundred pounds to the acre. The remainder of the crop, except H, from which was picked about one hundred and twenty pounds per acre, produced on an average fifty-five pounds to the acre. In reference to these and other instances of large returns from increased quantities of manure, it has been said, that three and a half or four acres to the hand cannot be assisted to the same extent. Granted. But may not one half or perhaps two-thirds of that number be? If so, the path of our duty is plain. If the owner of thirty laborers makes annually two thousand cart-loads of manure, is it better that that amount be placed on one hundred acres, or on seventy or eighty acres? That is the question to which a thousand well directed experiments, and every year's experience on our part, are ever ready to reply. The committee will conclude their remarks on this head, by recommending, that the practice of an equal division of our plantations be continued, but that only two and three-quarters or three acres to the hand be hereafter cultivated. In this way, there will remain in every enclosed field probably a large space of ground, which, in effect, will be an addition to the landed capital of the planter.

The ill success frequently attendant on compost manure, arises chiefly from its improper distribution. Instead of being strewn in the middle of the alley, it should be used *broad-cast*. In no other mode can it be thoroughly incorporated with the soil. By the old practice, cotton suffers in drought from the heating effects of the mass through which the tap-root passes. In sudden wet after dry weather, the excess of stimulus, which the plant from the position of its trunk is obliged to imbibe, deranges its functions, and brings on disease, and hence a shedding of its fruit.

Whether manures should be put on or under the listing, is yet an undetermined point. In this section of the State, the latter is considered the preferable plan. Manures are lost by evaporation and infiltration. If to the gases belong their more active ingredients, it follows, that under the listing is their proper place; if to the salts, then they should be covered very shallow. Manures near the surface certainly promote the growth of our

staple crop, when young, to a greater degree than where deeply buried; and as the season of spring is now invariably cold, it may not be an injudicious method. Every attentive observer, however, no doubt has remarked, that the result is in favor of the manures below the listing. The product of cotton, in the few instances known to the committee, being greater, though the plant itself was not always taller. From this an inference may be drawn, that the manure, which from its proximity to the surface, first displays its power, is the first and the soonest eventually to part with it; in other words, that by evaporation the greater loss is sustained.

The committee are now prepared to invite the attention of the society to the following means of renovation, which, if discerningly used, may be instrumental in restoring to our soils the vegetable matter of which it has been deprived by a long course of mismanagement. For the sake of convenience, they will be denominated positive and negative means, and first of the latter.

Rotation of crops.—On this subject there are two theories. 1. That whilst the continuous cultivation of any one crop deprives the soil of the specific aliment essential to its fructification, another plant, requiring some other food, may be advantageously substituted. 2. The celebrated botanist, De Candolle, says, "of the nutriment which vegetables receive and digest, they exude an inconsumable or innutritive portion by their roots. This excrementitious matter is supposed to unfit or poison the soil for a second crop of the same kind, until it is either consumed or neutralized by cultivation." May not this be the true reason why it is so difficult to "set cotton" on land planted for three or more consecutive years? As soon as the plants recover from their sickly state, and this takes place when the poisonous substance discharged from their roots is destroyed by tillage, the crop grows as vigorously, and the product is usually as good as on rested lands, where the same amount and kind of artificial nourishment have been applied.

The soils best adapted to cotton are cultivated every alternate year: the low black or dark gray lands being appropriated to corn. Guided by the lights of experience, it may with confidence be stated, that the two crops cannot, under any circumstances affecting seasons or management, profitably succeed each other. If, however, in the inclosed field, there be any number of acres suited to the raising of cotton, not desired to lie fallow, the sowing of oats, rye, Indian corn, in the drill, but especially peas, is strongly recommended. Whether the benefits of the two first proceed from the levelling of the ground, or that the quantity of nutriment is greater than that arising from grass and weeds, is unimportant; it is enough to know that the soil is thereby very considerably improved. Peas, called by an old planter of a sister state, the clover of the southern country, where an accession of vegetable matter is the primary object, should be put in the ground early in April and hoed but once or twice. A small product only will be the result. The growth of grass, however, which at a late period will be more than ordinarily abundant, with the increase of the leaves, stems, and ungathered portion of the pea crop, (seed only being saved,) will give double the amount of soluble substances, which, if the land had been at rest, it could have produced. Peas

sown in August is not an amender of the soil, unless ploughed in immediately before the period of ripening. Cotton after potatoes, allowing one year to intervene, succeeds well.

Ploughing in growing vegetables—summer or fall listings.—The former operation has been practised since the days of ancient Rome; and although there is much contrariety of opinion as to the time when vegetables should be restored to the earth, yet all agree that the process, either in a green or dry state, enriches the land. Dr. Dana is certain that "dry plants give more geine than green." Sir Humphrey Davy remarks, that "all green succulent plants contain saccharine or mucilaginous matter, with woody fibres, and readily ferment. When they are to be employed for enriching a soil, they should be ploughed in when in blossom, for it is at this period that they contain the largest quantity of easily soluble matter, and that their leaves are most active in forming nutritive matter." The experience of the best farmers in the eastern states seems to favor the views of the American chemist. Should the land be inclosed, it would be advisable to postpone listing it until autumn. The observation concerning the time when peas should be turned in, is equally applicable to oats, rye, and Indian corn, in the drill. The first is ripe in June, and the last attains its full growth, (it never bears fruit,) about the middle of July. It is then not too late for the earth to bring forth abundantly of her resources.

If pine trash, rushes, or other matter, difficult of fermentation, be designed to be used, its incorporation with the soil at as early a period as possible is recommended. Planters object to summer listings, because the sward being removed, the ground is exposed to the direct action of the sun, and thus evaporation is increased. This in part is certainly true. It was formerly the practice in northern countries, in order to insure rest to lands in the producing season, to prevent them by repeated ploughings from yielding any thing. This is known as the naked fallow system, which, on scientific principles, is erroneous. By an uncovered surface evaporation is not only augmented, but it is rendered greater too in proportion to the levelness of the ground. Even a partial cutting down of the beds, therefore, on which the last crop was raised, will, to the extent to which it is carried, aid in extracting from the soil its nutritive properties. It is important, however, in this inquiry to remember, that the tops of the old ridges are in general bare, and that in removing from them only earth enough to effect a slight covering of the vegetable matter placed in the alleys, the injury arising from the escape of the gaseous effluvia cannot be materially increased. If, nevertheless, this inference be not correct, it will detract but little from the proposed plan of amelioration.

Although the committee cannot concede the position, that the atmosphere is the great matrix of manures, yet it is undeniable, that plants do derive a very large portion of aliment from that source. On this principle is founded the system of deep ploughings. By it not only the soil but the substratum, if exposed a due length of time, will receive the salutary influence of the atmosphere. In reference to the immediate topic of consideration, the gases which the partial decomposition of the vegetable substances, only in part buried as pro-

posed, might emit, are necessarily taken up by the growing herbage, or crop, if one be subsequently sown, and by this means their valuable agency is retained and extended. The objections consequently to summer listings, unless done too late for the earth to give a coating of grass, do not in theory possess that weight to which it is thought to be entitled. In practice, the plan, it is experimentally known, where rushes or pine-straw is used, is decidedly proper. The breaking down and softening the woody fibre, and thus preparing it for the process of fermentation, is the important point which is gained. It is asserted too, that, in this way, the destruction of bugs and other insects, or their eggs, may be effected. The frosts and rains of winter will further the progress of the good work. It may not be unimportant to state that, if the listed land be inclosed, that part of the surface which is exposed may be soon shaded by sowing the common field pea. Evaporation will thereby be prevented, and a useful addition made to the store of vegetables.

The inclosing system.—To whatever extent the industry, skill, and resource of the planter may enable him to provide for the improvement of his lands, it is not probable that, according to any known scheme of management, he will ever succeed in furnishing an impoverished soil with the quantity of aliment its wants really require. The planters of this island do annually manure every foot of ground which is cultivated in cotton; and, it may be added, in provisions too.* Still the amount of food per acre, apparently large, is far short of what their interests would invite them to apply. They cannot succeed in returning to the soil even for one year perhaps the one half of the nutriment originally furnished it by nature. Other means of melioration then must be resorted to. Clover and plaster are not adapted to our climate, and no foreign or domestic grasses have yet been substituted for them. The inclosing system, therefore, strongly invites our notice. To adopt it in part, which only is practicable, the planting of less ground for the force employed, and the keeping of smaller stocks, will of course be measures of necessity. All enemies to composts on scientific principles, (and in this class are comprehended many intelligent farmers, or those who have failed in the application of them,) seem to coincide in the belief, that the inclosing system offers the readiest mode of returning to the soil the organic matter of which repeated croppings may have deprived it. It especially recommends itself for its saving of time and money to the planter, and of labor to both man and beast. In order, however, to reap its full benefits, the land should be levelled in the fall, and in the following autumn listed for a crop. "To draw from the atmosphere† the greatest quantity of manure, to check the loss the earth sustains from evaporation, during the process of shade, to give the manure the most lasting form, and to deposit it in the most beneficial manner,

* To accomplish this, one cart to every five laborers is necessary.

† The experiment of the willow—planted a slip in a box, containing two hundred pounds of earth, and at the end of a few years, exhibiting a tree of two hundred pounds weight, without having diminished the earth in which it grew, demonstrates the power of the vegetable world to extract and to elaborate the atmospheric manure.—*Taylor's Arator*.

are," in the language of Colonel Taylor, "the primary objects of the inclosing system." The objection to Arator's theory, in its most comprehensive sense, is, that, in the creation and sustaining of vegetable life, the earth is made to play a subordinate part—nay, that it is the mere home of plants, without the ability of contributing to their subsistence. If nothing is nourishment to a vegetable but what enters into the permanent composition of a vegetable, the conclusion is irresistible that, as all plants on analysis yield an earthy product, and the product is found to partake most of the earth that predominates in the soil, producing the analyzed plant, earth is necessary to plants as food. That air,* however, is essential to vegetables, is conceded. A seed deprived of air will not germinate, and a plant placed under an exhausted receiver, will soon perish.

Of positive means of melioration—manures.—Manures may properly be divided into three kinds, manures of nourishment, manures of stimulus, and mechanical manures. Of the first the committee have already spoken. In relation to the second, it may be remarked, that whatever substances enable plants to digest more than under ordinary circumstances they could consume, and accelerate decomposition, are manures of stimulus. Hence the efficacy of salt, lime, gypsum, &c. Mechanical manures are those which effect modifications of the component earthy parts of soils, by which they are enabled to increase or diminish their absorbent powers. Of this description is the addition of clay to sand to make it more retentive, or of sand to clay to lessen the tenacity of the latter.

The long mooted point concerning the relative advantages of long and short muck, has been settled by a series of experiments instituted by scientific men. Short muck will give the best crop the first year; long muck, the second. In regard to cotton, the former is preferred, because its early efficacy is indicated in the production of bottom fruit—because, the plant being rarely overstimulated, the inevitable result where fermentation is too rapid, a new growth is prevented—because, by the use of the latter, the looseness of the soil is increased, and the escape by evaporation of carbonic acid with ammonia is of course materially assisted—because, as our fields are planted every alternate year, no advantage would accrue from long muck, except to the grasses, even if it be true that its effects are more decidedly beneficial the second season. Decomposition, it ought distinctly to be remembered, should not be carried so far as to present only a black mass, without heat or smell.

Cotton seed.—This is undoubtedly a manure of nourishment. Its value is derived from its olea-

* Priestley first, and Lavoisier after him, analyzed air, and found that when pure, it consisted of about seventy parts of azote, twenty-seven of oxygen, and two of carbonic acid. In its ordinary (or impure) state, it is loaded with foreign and light bodies, such as mineral, animal and vegetable vapors, the seeds of plants and the eggs of insects. It is to this aggregate that vegetation owes the services rendered to it by air.

† Carbonic acid is formed and given out during the process of fermentation, and makes twenty-eight parts of one hundred of atmospheric air. It is composed, (according to Davy,) of oxygen and carbon, in the proportion of thirty-four of the former to thirteen of the latter.

ginous property, as all oils are composed of carbon and hydrogen. On high lands, from four to six quarts of *live* seed to the task row, (one hundred and five feet,) where the ground has received a coating of mud, at the rate of forty cart-loads per acre, may be relied upon with perhaps more certainty for cotton, especially of an irregular season than any other application. If used alone, a half-bushel, or even a less quantity, should the land be not too poor, is the proper amount. For dark soils, it is thought no manure answers better, particularly if combined with marsh-mud. To corn, from one peck to a half-bushel to the row, *below* the list, it is of greater benefit than three bushels of the best compost.

Marsh.—In a green state from twenty-five to thirty cart-loads per acre ought to be applied. If decomposed, a smaller quantity may be used. Autumn, or early in the winter, is the proper time for turning it into the ground. It is an advantage to all soils, but especially to those of a black, or dark gray color. Listing it, in the summer is often attended with the happiest consequences. Where this is done, it sometimes happens that, in light lands, the cotton-plant becomes "blue." It is hence advisable to postpone imbedding it until a later period.

Rushes and pine trash.—Both of these vegetable substances need artificial aid to convert them into geine. By the usual processes of nature, they are scarcely brought to a completely soluble state in two years. By being buried in summer, as already advised, they do exercise nevertheless a material influence on vegetation; and this arises, in reference to the first, from the decomposition of the mass of spongy matter which at that time is contained in the body of the plant; secondly, from its saline properties and its attraction for moisture. With the constituent parts of pine trash the committee are unacquainted. In a drought, put around corn, it will revive it and restore its greenness of color as quickly as salt. It is known too, to our most experienced planters that, if used alone, its efficacy is only apparent on light and dry lands. From these facts the inference is drawn, that it ministers to the growing crop by collecting and retaining moisture. Another reason why, if undecomposed, it should be covered in summer, suggests itself. It is believed, that pine straw contains an acid principle, which in time, through the agency of the calcareous matter of the soil, is neutralized. By being thrown into a litter-pen the same effect is produced.

Marsh-mud.—This is not a manure of nourishment, where marsh itself is not combined with it. The evidence on this head is conclusive, as it does not but very slightly increase the growth of the cotton plant. From the analysis of Professor Shepard, it seems to contain more valuable properties of a permanently beneficial kind than any other natural compound. The great disparity between I and K, and the other analyzed specimens, in regard to the water of absorption, to organic matter and alumina, shows, that by marsh-mud, judiciously gathered and applied, the amending of our lands, though the operation will unquestionably be gradual, may confidently be relied upon. The differences of opinion as to the utility of this manure, arises solely from the difference in the component parts of the substance itself. Frequently, in the immediate neighborhood of each other, samples

are drawn wholly dissimilar in many essential respects. I and K were taken from the same bed, and only a few feet apart, yet one has ingredients of which the other is entirely deficient. As it is important to add to its highly useful and efficacious powers the desirable quality of contributing directly to nourish the cotton plant, the surface of the mud-bank only, containing as it does much vegetable matter, should be dug. The more tenacious the quality, known by its strongly adhering to the hoe, the better, if its mechanical effects are wanted; the lighter, when dry, the greater is the quantity of vegetable aliment of which it is composed. It is for this reason that turf-mud is as highly (if not more) esteemed, as any other description, except that perhaps in which comminuted shells are found. Dry mud, although by exposure it will lose its carbonic acid, which, however, is in general very inconsiderable, has been experimentally proved to be decidedly more useful than when wet or newly taken up. In the latter state, it is incapable of intermixing with the soil. If the fertility of earths depends on the fineness of their particles, the favorite theory of the celebrated Tull, a mass of hard matter, though it be alluvium, cannot contribute materially to the fructification of plants. Of a very dry season, wet mud is known to be valuable. This arises from its saline ingredient, which keeps it always moist.

It may here be appropriately observed, that if the rotation system be a judicious means of improving lands for cotton, the alternation of manures is equally advisable in increasing the product of the crop. The change from mechanical and stimulating to manures of nourishment, has given the most favorable results. There is no doubt that, after perhaps the first year, when a cart-load of mud to the task-row is necessary, one-half of that quantity will produce all the effects which would be expected from the use of a larger amount. Although it may not be true with regard to other manures, yet it is undeniable, that lands seem to tire of marsh-mud after three or four consecutive applications. This probably arises from the soil possessing, at the end of that time, a sufficient portion of all the nutritive properties, which, as far as this substance is concerned, are essential to the procreative powers of the cotton plant. The addition of more mud is consequently not only unavailing, but perhaps from its very excess operates disadvantageously. The generating cause of the "blue disease" in cotton is unknown. The remedy fortunately is no longer one of the arcana of nature. Plantations, which at one time bid fair to impoverish their owners, are now, by the free use of mud, among the most profitable. The individual who first in practice developed the fertilizing properties of this inexhaustible compound, is entitled to all the honors which are due to benefactors of their country.

Salt.—Sir John Sinclair, in his treatise on this subject, says, "salt employed in large quantities, in its natural state, is hostile to vegetation, yet it operates advantageously in various ways when judiciously applied to arable lands. In large quantities it has a tendency, like every other excessive

stimulant, to disorganize and destroy the vegetable substances with which it comes in contact; but in moderate quantities, it promotes the growth of vegetables." Author Young observes, "that the application of sea-water to vegetables generates putrescent hepatic gas, caused by the mixture of vegetable juices with the vitriolic neutral salts contained in sea-water. Muriate of magnesia, forms one-fourth of the saline matter of sea-water. Very considerable benefit has been experienced from its use in promoting vegetation, when mixed with dung or compost dung-hills. It possesses a septic power that promotes putrefaction." The Chinese make use of sea-water as manure near their coasts. In the interior they scatter salt over their fields before they are tilled. The same practice is pursued in Hindostan and by the Milanese. From the time of Lord Bacon, sea-sand, the principal value of which lies in the salt with which it is impregnated, has been extensively used, where obtainable, in nearly all the countries of Europe. In 1819, it was given in evidence before a committee of the house of commons, that there is always a violent strife among the farmers of Cornwall for the largest share, whenever the refuse salt, used in curing fish, is for sale. The money laid out in Cornwall, and the adjoining counties, for sea-sand, amounted, one hundred and ten years ago, to £32,000: and so much has the practice increased, says an English writer of 1820, that the expense of land carriage for sand, used as a manure in Cornwall alone, now amounts at least to £30,000 annually. All the authorities to which the committee have had access, unite in the following testimony.

1. In small quantities salt has septic properties; in large quantities it is an antiseptic, or counteracts putrefaction.

2. Attracts and retains moisture.

3. In relation to corn, Irish potatoes, barley, hemp, flax, and many other crops, its beneficial influence is beyond dispute. For grass lands, especially in dry and hot summers, no application is represented to be better. It is a preventive to the blight and mildew in wheat, and effectually destroys all noxious weeds, grubs, worms and insects. As salt is a stimulant, it should of course be mixed with animal or vegetable substances, and never used alone. It is known to the committee, that if incorporated with the compost heap, or the organic matter buried with the sward, it will not only increase the productive power of cotton, but preserve its health and bring it early to maturity. The quantity successfully tried on this island, has varied from one pint of clean Liverpool salt to a quart, to the row, on the listing, or from two and a half to five bushels to the acre. A larger amount, checks the growth of cotton, and hence operates injuriously on poor soils. For grass-lands, six bushels of foul salt to the acre are recommended; and as one of the means of preparing grounds for the usual crops in northern countries, sixteen bushels per acre, it appears, ought to be used. When mixed with ashes, lime or soot, its meliorating power is greatly increased.

Animal manure.—The following analysis, by Kirwan, is worthy of especial notice:

	CHARCOAL.	LIME.	CLAY.	SAND.	FIXED SALTS.	CARB. HYD., CARB. ACID AND WATER.
105 lbs. of Cow-dung, } to the	8.75	1.20	0.15	2.4	0.6	92.80
" " Horse " }	10.02	1.50	0.50	3.0	0.21	89.77
" " Sheep " }	25.00	10.28	29.00	29.0	0.72	68.00

The vast superiority of the last is very manifest. Let not this, however, mislead the judgment of the planter. The ordure of sheep, maugre its intrinsic value, is the most costly manure, when the food that animal consumes is considered, that is now used.

The English practice of strewing animal manure on vegetable substances is not pursued, it is believed, in our southern country. With us the universal method is, where a sufficient amount of vegetable matter has been brought together, to inclose the stock at nights on the heap, until it has been reduced to a proper consistency, through the process of fermentation. This brings the committee to the consideration of the manner of making composts, and the materials of which they should consist.

Composts.—On this subject four important considerations present themselves.—1. The selection of a suitable site. 2. The use of retentive absorbents. 3. The collecting and adding together such materials as contain the greatest quantity of nutriment. 4. The preventing of waste. The site should be level ground, in the immediate vicinity of a bed of clay. Around it let an embankment be thrown up, with the ditch facing outwards.

In our sandy lands decomposition is rapid. Whilst the volatile portions of vegetable substances are perpetually escaping in the form of vapor, the earthy parts sink and are lost in the soil. By this means we ignorantly yield, perhaps, one-third of the treasure, which our unwearied efforts had been instrumental in gathering. To avoid this long practised error, the use of retentive absorbents, such as common clay and pine trash, are strongly recommended.

The following plan of increasing the quantity and improving the quality of manures, the sole object of composts, is considered judicious and proper:

1. Six or eight inches of common clay with as many bushels of foul salt intermixed.
2. A layer of pine trash with salt.
3. Animal dung. Keeping stocks on the mass for four or five weeks will subserve the purpose aimed at.
4. Vegetable and other matter, such as fennel and weeds on the edges of ditches and fences, thistles, oat-straw, corn-cobs, ashes,* soot,† corn-stalks, broom-grass, scrapings of yards, where there is no joint or nut-grass, pond-mud, and, in general, all the filth and rubbish of a plantation.
5. A few bushels of salt.

Upon these variant materials, let the cattle be nightly penned, until decomposition is carried sufficiently far—then cover the whole with clay. Whilst the clay and pine trash at the bottom, each aided by the influence of salt, will imbibe and hold the salts of the urine and other substances, which are usually lost, the surface clay will arrest and retain the gaseous effluvia, constituting as they do one-half, and perhaps the more

beneficial one of the entire bulk. By this mode too, dead matter is converted into mould. The surface clay will not only be impregnated with the enriching properties of the evaporating particles of the mass, but, if exposed a sufficient length of time, will be rendered still more valuable by the fertilizing action of the atmosphere itself. In proof of this, setting aside theoretical principles and the usage on our northern farms, where the subject of composts is well understood, it is with us a matter of annual notice, that clay from the bottom of ditches, several feet below the soil, if thrown on the surface, will, the first season, produce a better crop than the contiguous sandy part. That some of the beneficial effects thus witnessed are ascribable to mechanical agency, is doubtless true. Hence, in this respect, common clay, which is nearly free from silicious earth, is far more efficacious in its operation than marsh-mud, which has only a small portion of alumina. Our composts contain in general only two ingredients—animal dung and pine-trash; sometimes rushes or marsh is added, and occasionally mud. The reason assigned is, that the supply of pine-trash is abundant. There are nevertheless solid objections to the too liberal use of this substance. In the first place, it is the nursery bed of insects, which are so tenacious of life, that to destroy them the putrefactive process must be carried to a point beyond what prudence would advise. Again, pine-trash possesses a large proportion of inert matter, which is scarcely soluble. It is, perhaps, for this reason, that it is decidedly inferior to marsh, rushes, corn-stalks, &c. Exclusive of these important suggestions, it is well ascertained, that the value of composts depends on the variety of their materials, or a proper admixture of animal manure with vegetables, containing the largest amount of geine. This is a proof of a very decided character that, as a general rule, for there are exceptions, a compound is better than any one of the elements that compose it.

Of all the substances profitable as manure, perhaps corn-stalks occupy the front rank. To scientific researches are we indebted for the knowledge of this useful truth. 1000 parts, says Davy, gave 84 parts of ashes; and 1000 parts of those ashes afforded 72.56 of soluble matter. It is known that, after the shocks and outer covering have been eaten by the cattle, the stalks are allowed to rot and give their virtue to the air. Using this plant, therefore, as manure, by burying it in the fall, or throwing it into the compost heap, is not robbing the soil on which it grew, unless the roots are taken, which of course should never be done. Here then is a source from which an abundant supply of the best aliment may be drawn.

Among the ends to be answered by the position of the larger part of the salt, the annihilation of the vermin with which, as already remarked, pine-trash abounds, is one of the most important.

It is not advised, though pounded shells thrown upon the pine-trash would have a happy tendency, that lime be added to the compost heap; because all the advantages to be realized from such a measure, are attainable by spreading the calcareous earth on the land, where it is most needed.

The mixed compost, thus briefly considered, recommends itself for its economy, variety of ingredients and facility of construction; for being composed of highly nutritious as well as stimu-

* A bushel of ashes, says Dr. Dana, is equal to a cask of lime.

† In 100 parts of soot there are, besides other ingredients of value,

89.70 of geine.

5.00 of sulphate of lime.

1.50 of phosphate of lime and iron.

3.85 of straw.—Dr. Dana.

lating and mechanical matter—and, as affording in relation to one of its conspicuous component parts, the means of profit, from which the cotton plant could before derive no assistance.

Lime.—As preliminary to their comments on this head, the committee would invite the attention of the society to Edmund Ruffin's interesting and instructive essay on calcareous manures. No treatise on any agricultural subject, emanating from the American press, has effected such valuable results, not only in this country but in Europe. In regard to Virginia, it has literally converted an abandoned soil into fruitful and luxuriant fields.

Lime is never found naturally in a pure state. It occupies a middle region between sand and clay. It benefits the former by rendering it more firm and adhesive, and the latter by making it less so. Deprived of its water and carbonic acid by fire,* it is called quick lime. Combined with carbonic acid in common limestone, the shells of marine animals, &c., it is known as mild lime, or the carbonate of lime. With a friable mixture of clay, it receives the appellation of marl.† The sulphate of lime (gypsum or plaster of Paris) is composed of sulphur and oxygen, and the phosphate of lime, is the basis of bone manure. Whilst lime (caustic or quick lime) is a powerful promoter of putrefaction, its carbonate (mild lime) retards that process. The former is only used where there is an excess of organic matter. It recomposes so quickly with carbonic acid, if exposed to the atmosphere, that, where its solvent powers are needed, it should be applied as soon after it is slacked as possible. Mild lime, in the form of ground or powdered shells, by preventing the too rapid decomposition of vegetable substances, performs a highly useful function. For this reason, no sudden increase of fertility is to be expected from calcareous manures. When it is considered that, in our hot climate, the putrefactive process is readily brought about, and that our lands, from their light and porous nature, are too favorable to the escape of the volatile parts given out by fermentation, any substance that, whilst it attracts moisture, will yield food only to the growing plant; that will combine with and fix manures in the soil; (sand has no power in holding vegetable and animal manures,) that will impregnate the earth with aliment drawn from the atmosphere;

* The heat that is evolved in the process of slacking lime, is the caloric of the water, (for which it possesses so strong an affinity, that it will absorb one-fourth of its weight of that fluid, and yet remain perfectly dry,) as it passes to its solid state, and does not proceed from the lime as is sometimes supposed.

—Parkes.

† "Pure marl, when dry, is almost as white as chalk, and much lighter than common soil. When wet, it is of a light gray color, especially if it contain much organic matter. When wet, it is plastic and adhesive; when dry, it falls into a fine powder. Found almost exclusively in swampy ground, generally in quite wet swamps, and is always covered by a stratum, often several feet thick, of black vegetable matter approaching to peat. It resembles white clay and sand. To find it make use of a pole—some will adhere."—H. Colman, *Commissioner for the Agricultural Survey of Massachusetts*.

‡ Cotton gives 1 per cent. ashes, of which 17 per cent. is composed of phosphate of lime and magnesia.

—Dr. Dana.

that will hasten the ripening of the crop, and that will neutralize acids, possesses properties of rare value to the planter. Such a substance is mild lime.

All soils destitute of calcareous matter have acid properties; and, on the high authority of Mr. Ruffin, such soils possess the power of reducing to powder the comminuted shells, which by the plough or otherwise may be mixed with them. The quantity of mild lime used to the acre is from fifty to three hundred bushels—to be renewed in ten or fifteen years. The best shells, whether oyster, clam, or muscle, are those from which the living principle has recently been taken. Such are infinitely to be preferred to the calcareous beds, which on the edges of our rivers have been bleaching perhaps for a century. The first contains mud and animal matter, and is otherwise richer in its saline ingredients. If no other efforts be made by the planter in this business, than to burn and use as a manure the oyster shells which the industry of his negroes may have thrown about their dwellings, he will confer on them, as far as their health is concerned, and on his lands, especially where broom-grass is wont to grow, a benefit of incalculable magnitude.

Mr. Ruffin, as a prudent admonition to those who may be disposed to try the virtues of calcareous manures, says, "its benefits must necessarily be gradual, never quickly perceptible, nor can it be expected at all, unless on soils under meliorating culture, which will allow more to return to the earth than is taken off." In confirmation of this opinion, he gives the result of twelve years' trial of liming very poor land sown in wheat. The first three years, the average product was five bushels and one-third; the next three—eight bushels, and the last three, ten bushels and a half; thus doubling his crop mainly (the land rested two years in four, and was not grazed,) from a single though heavy dressing of mild lime.

The committee cannot conclude their report without submitting a few reflections suggested by Professor Shepard's communication. To chemical science alone are we indebted for the information it imparts. From no other source could light have been shed upon a matter so replete with interest to the owner of sea-island lands. "Agricultural chemistry," said Sir Humphrey Davy, "has for its objects all those changes in the arrangements of matter connected with the growth and nourishment of plants; the comparative values of their produce as food; the constitution of soils; the manner in which lands are enriched by manure or rendered fertile by the different processes of cultivation. Inquiries of such a nature cannot but be interesting and important, both to the theoretical agriculturist and to the practical farmer. To the first, they are necessary in supplying most of the fundamental principles on which the theory of the art depends. To the second, they are useful in affording simple and easy experiments for directing his labors, and for enabling him to pursue a certain and systematic plan of improvement." "Man," he elsewhere beautifully remarks, "must consider the vegetable kingdom, not as a secure and unalterable inheritance, spontaneously providing for his wants, but as a doubtful and insecure possession, to be preserved only by labor and extended and perfected by ingenuity." An acquaintance with the funda-

mental laws which regulate the operations of husbandry are as necessary to the agriculturist, as a scientific knowledge of the human system and of materia medica is to the followers of the healing art. The empiric who indiscriminately prescribes one or two favorite nostrums, merits the contempt of every man who values human life. Yet, the husbandman, who enters the temple of science, the better to qualify him for the proper discharge of his multifarious and complicated duties, is viewed as a mid-day dreamer, who seeks for that, which, if acquired, would only unfit him for his pursuit, by diverting his attention to objects of uncertain and subordinate interest. Although we are justly told by one of the profoundest philosophers* of any age, that when theoretical knowledge and practical skill are happily combined in the same person, the intellectual power of man appears in its full perfection, and fits him equally to conduct with a masterly hand the details of ordinary business, and to contend successfully with the untold difficulties of new and perplexing situations—still, it is deeply humiliating to declare, that in the sober judgment of perhaps every agricultural community, theory and practice are antagonistic;—they cannot successfully be united in the same individual. If the vegetable world possesses a living principle—if every species has a regular organization, which requires for its support an incessant supply of food—if each plant has its period of growth, health, disease, decay, and death, is it not certain, that the laws which govern vegetables are fixed and immutable? If so, is an acquaintance with those laws unimportant, especially to him whose province it is to aid nature in replenishing the earth with food? What information can mere observation impart to the farmer concerning the composition of his soils and manures? He knows that a particular plant will not thrive upon a certain soil. But why? No answer is heard. He scours the belief, that the man of science, whose book, it may be, is his sole guide, and who perhaps has never been beyond the purlieus of his city abode, can instruct him in his vocation, and by so doing greatly promote his temporal welfare. Yet the fact is indisputable. A portion of the farm of Sir Joseph Banks was sterile. All his exertions to raise one of the numerous crops usually cultivated, failed. A specimen of the soil was put into the hands of a chemist of London, who readily detected the sulphate of iron. The remedy, carbonate of lime, was applied—and the enemy that had so long baffled the well directed efforts of this distinguished nobleman and agriculturist, ceased longer to assail him.

All which is respectfully submitted by
 WHITEMARSH B. SEABROOK,
 WILLIAM M. MURRAY,
 G. W. WESTCOAT, *Committee.*
Edisto Island, July 13th, 1840.

CORRESPONDENCE BETWEEN THE AGRICULTURAL SOCIETY OF ST. JOHN'S, COLLETON, S. C., AND THE EDITOR.

To the Editor of the Farmers' Register.

Edisto Island, August 26th, 1840.

At a late meeting of the "Agricultural Society

* Stewart.

of St. John's, Colleton," the following resolution was adopted:

"*Resolved*, That the corresponding secretary be directed to address a letter to Mr. Ruffin, Editor of the Farmers' Register, respectfully asking whether, if he be the cultivator of cotton, he uses lime as a manure; whether the beneficial effects are seen the first season; whether quick or mild lime is preferred, and the quantity of each necessary to an acre. Whether used alone, or with compost; and, in fine, that he furnish, if not incompatible with his other duties, all the information in relation to calcareous matter, as a manure for cotton, which it may be important to communicate."

The attention of the planters of this island has been called to the consideration of the subject embraced in the above resolution, from the fact, that whilst they have succeeded, by the liberal use of enriching manures, in maintaining the original strength of their lands, they would appear to have failed in preserving in them that principle which is peculiarly adapted to the production of cotton, if we are to judge from the diminished results of each year's labors. Prof. Shepard, in his analysis of the soils of this island, is inclined to the opinion, that the "peculiar fertility of the new sea-island cotton land may be owing to the proportion of comminuted shells, natural to such soils, and the deterioration of these lands under long cultivation, ascribable to the exhaustion of carbonate of lime." If you can communicate to us any information in relation to this subject, I scarce need assure you that it will be thankfully received.

With sentiments of high respect and esteem, I remain yours, &c.

J. JENKINS MIKELL,
Corres. Sec.

REPLY.

SIR—In answer to the inquiries which the Agricultural Society of St. John's, Colleton, have recently honored me by making, I can offer almost nothing of such particular facts and accurate results of comparative experiments, in regard to lime on cotton, as seem to be called for by the resolution of the society. At a former time I cultivated cotton, and on a large scale, for so northern a latitude (37° 17') and for five years in succession. Still, the culture, as a field crop, was a novelty in this region, and, to me especially, a matter of experiment, which, after sufficient trial, was abandoned by me, as too little suited to our climate, and still less to good and improving farming. Before I began to cultivate cotton, nearly all my open land had been made calcareous, by marling; and as the best land of the farm was devoted to cotton, it followed that of all the land cultivated in that crop (varying from 48 to 96 acres yearly,) there was no part which had not been marled. Of course there were no means offered of comparing the results with those of similar land without marl. But I did not deem this deficiency important to myself, inasmuch as I entertained no doubt whatever of the advantage of calcareous manure to the increase of product of cotton being as great as to that of other crops, which had been more carefully observed. There was another advantage peculiar to cotton, which I was as well convinced of my receiving the benefit of, but which

a'so, for the reason above stated, wanted the confirmation of any accurate comparative experiment. This was the general operation of calcareous manures to forward the ripening of all crops; and this effect on cotton is especially valuable in our climate, though not in your warmer region. In the five years during which I planted cotton extensively, there was no material diminution of the quantity of any crop, caused by the frost destroying unripe pods; and in only one of the years, according to my present recollection, was there any notable, or noticed, portion of the last gathered cotton, injured in quality by being made yellow, by the severity of frost on the green pods; which is a very common evil in the cotton crops here, on lands not calcareous. As to general product, my richest lot of 25 acres, produced more than 1000 pounds of seed-cotton (short staple, of course,) to the acre. Two acres, separately and accurately measured, produced 1300 lbs. to the acre. These were the weights as brought from the field, and by weighing the day's work of each hand at night. Of course, the subsequent drying would have reduced these weights. The above products were on very good soil, slightly calcareous naturally, and made more so by marling. On another field, naturally poor and acid, but improved by marling, to the product of 30 bushels of corn to the acre, the first and best product of cotton (weighed as gathered) was barely 600 lbs., and which soon fell to 300 and less to the acre in subsequent cultivations. It may be proper to state that cotton cultivation was continued on the same land several years in succession, as long as the crop was raised on the farm.

My applications of calcareous manures were confined to shell-marl; consequently, the lime was always in the mild, or carbonated state. Between quick-lime and any of the forms of carbonate of lime, my choice would be directed solely by the consideration of the greater cheapness in application of the one or the other. Deeming, however, that the caustic quality of burnt lime is rarely if ever desirable in the soil, I would prefer such mode of treating quick-lime, whether of shells or stone, as would most facilitate its becoming carbonated, before being applied to the soil, or as soon after, and effectually, as possible. In the admitted absence of any experimental knowledge of my own on this head, and therefore relying on the opinions of others, I would especially recommend to the cotton planters of Edisto, the practice of the late Fielding Lewis of Virginia, (which is general on the liming farms of James River,) in regard to shell-lime, applied alone, and to the directions of M. Puvis, in his valuable 'Essay on Lime,' for making composts of lime and rich vegetable soil. The first of these articles is in the first volume of Farmers' Register, and the translation of M. Puvis' work in the third volume, both of which were formerly furnished to your society, and I presume remain in its library. Where marsh grass and mud are so extensively used for manure, as on your coast, I should suppose that the making of compost heaps of those alimentary manures with quick-lime, would greatly add to the separate values of all the different materials.

Knowing so little as I do of the soil and agriculture of the sea-islands of South Carolina, I am well aware that any opinions of mine bearing on their particular qualities or defects, must be of

very little worth. But with this general admission, and notwithstanding my very high opinion of the value of calcareous manures, I must beg leave to dissent from the opinion of Professor Shepard, which you quote. That the natural proportion of comminuted shells in these soils was the source of their original and long enduring fertility, I fully believe; and, as much, that the artificial addition of calcareous matter, where but a trace remains, and still more where no carbonate of lime is now found, would be highly advantageous. But the disappearance of the carbonate of lime in these soils, (as found by the analyses of Professor Shepard,) does not, in my opinion, indicate the removal of what formerly existed there, at least in any great degree; but rather, by its being acted on by the acid of the soil, its change from the carbonate to some other salt of lime. The general reasons for this opinion have been given at length in the chapter on the "Proofs of the existence of acid and neutral soils," in the 'Essay on Calcareous Manures.' And the new form in which the lime remains, seems to be no less beneficial as a fertilizer, and fixer and retainer of other fertilizing matters, than its original form of carbonate of lime.

It is true that there are two natural modes of operation by which carbonate of lime in soil may be continually abstracted or removed, though in very small amounts. All growing plants take up some lime from the soil in which they stand, and though the quantity is usually very minute, still that small quantity is absolutely necessary to the healthy existence and perfection of every plant. And, in this belief, I thence infer, that every soil, capable of producing any vegetable cover, must contain some trace of lime in some state of combination, (though almost no natural soils in the Atlantic states contain the smallest portion of the carbonate of lime;) and that without some minute portion of lime, every soil would be entirely barren and naked. In short, that it is simply and solely the presence of lime, and the operation of this lime in combining with, and fixing alimentary matters, that serve to form what we term soil, which, whether rich or poor, is always strongly contrasted with the entirely barren sub-soil below.

But though the crops grown on the soil, and especially when annually and generally carried off, must take away a part of the lime of the soil, the quantity is so small, that a century would scarcely show a sensible diminution. And if a manuring system were kept up, as is the case with your cotton-lands, the probability is, that the vegetable manure applied would contain and restore to the soil fully as much as was taken off in the crops. Indeed, if, as I suppose, the cotton fibre alone be removed from the sea-island fields, there would be very little loss of lime to the land, the fibre being almost entirely composed of carbon.

Another source of loss of carbonate of lime to soil is by its solution in rain-water, and being thus carried away in torrents, or descending to form springs. Carbonate of lime is insoluble in water alone, and therefore would be subject to no such cause of waste. But rain-water has dissolved in it a small proportion of carbonic acid, and so far is made a solvent of carbonate of lime. It is by the percolation of rain-water that all limestone waters are formed; and as soon as they lose

their excess of carbonic acid, (which is very easily effected,) the carbonate of lime held in solution is dropped. It is by this process, slow and small in each particular effect as it is, that the solid limestone foundations of mountainous regions, are hollowed out into immense caverns, and that all the streams are saturated with dissolved carbonate of lime. And the waste and removal of this substance (which goes to fertilize other lands) must be enormous, where there exists so much carbonate of lime, in excess beyond all the wants of the soil and its vegetable products. But where there is no such excess, I believe that the attraction of the soil for the lime is stronger than the solvent power of rain-water, and that none is so lost, unless the soil in a mass be washed away. And with so level a surface, and sandy and open soil and sub-soil, as the sea-islands have, if there could be any carbonate of lime so dissolved, it could not flow off in the water, but would merely sink into the sand, and thus serve to deepen the fertile portion of the soil.

Feeling a strong and general interest in the agricultural improvement of South Carolina, and especially by the means of the calcareous manures with which the country has been so bountifully supplied by nature, and which are as yet almost entirely overlooked and neglected, I should rejoice to aid the excellent objects of your society to promote that best of all possible modes of fertilization. It is therefore the more regretted by me, that, in regard to all the information on particular points required of me, my reply should be necessarily of so little worth. On the subject generally, perhaps my opinions might be of more value. I therefore beg leave to present twenty copies of my general work on this subject, the 'Essay on Calcareous Manures,' through you to the Agricultural Society of St. John's, Colleton; and earnestly hope that this and all other existing sources of information, on that important subject, may be permitted to operate fully for the improvement and profit of South Carolina.

Respectfully,

EDMUND RUFFIN.

To J. JENKINS MIKELL, ESQ.
Cor. Sec. Agr. Soc. of St. John's, Colleton, S. C.

THE BURNING MOUNTAIN.

From the Lehigh (Pa.) Bulletin.

Mt. Vesuvius, Schuylkill Co., May 31.

Mr. Editor:—I this morning paid a visit to this place, situated about 4 miles N. E. of Minersville, and by road 8 miles from Pottsville, to see the wonderful effects of a coal mine on fire. Arriving at the foot of the mountain, by the lateral railroad I approached the mouth of the mine, from which there issued considerable water, which, to the taste, is highly charged with sulphur, and some iron corroded from the rails, laid in the gangway of the mine, and depositing a sediment approaching near the color of chromic yellow.

It was at this opening the fire took place in January, 1888, caused by the miners having made a fire in the mouth of it, to keep the waters from freezing about the rails, so that they could commence their operations early in the spring, which, through carelessness, ignited the propping of the

gangway, and from which it communicated to the coal dirt, before it was discovered. The miners then endeavored to extinguish it, but it was beyond their power, and after having worked at it two nights and a day, they left it in despair of stopping its ravages, and which it is now impossible to stop.

Going from thence up the mountain, (which faces the south) about 150 yards, I arrived at the first crater, which is in the shape of an inverted elliptical cone, about 40 by 70 feet diameter, and sunk some 15 feet below the surface, in the centre of which, the coal vein or mine is on fire, mouldering, as it were, with dirt and stones which have caved in upon it; the stones are burnt to appearance like lime. The smell of sulphur here is highly perceptible; from the north end of this crater, there issues a rumbling noise like distant thunder and the heat appears to be intense. About 30 feet higher up the mountain, I arrived at another crater, perhaps 30 feet in diameter, which is a chasm apparently about 30 feet deep, with much smoke issuing from the connexion with the first crater on its south; the west side of this chasm is a mass of immense stone, with fire under it as far as the opening exists; the rumbling noise before mentioned is here more distinct than at the first crater, and the heat greater, both caused, perhaps, by the wind being from the south. The smoke and sulphur on the east side was very annoying to me, and caused me to shift my situation to the west side, passing, for the purpose, between the first and second crater, over a strip of ground about 30 feet wide; knowing it to be undermined by fire, and then in full blast, caused me to tread lightly, (such is the effect of habit,) for fear of breaking it down, which had I done, I should have been engulfed in a horrible death.

Further up the mountain, some 50 feet apart, are three more craters, similar to the first in size, but there is no rumbling issued from either of them. There have been others of similar size, which are now filled up, except one which is not more than four feet in diameter, from which issues steam.

Upon reaching the extremity of the fire, as far as discernible, I had a fair view of the damages done upon the surface of the hill. For perhaps 50 to 60 acres, all vegetation has been destroyed, and the herbage and sprouts are quite red, which have a pretty effect at a distance, but upon the spot the appearance is desolate, not a blade of grass nor a green leaf or twig meets the eye, as far as the influence under ground has acted.

On my return to New Castle, which is at the west foot of the mountain, I was informed that the mine belonged to Messrs. Dundass, Richards & Co., of Philadelphia, and that the coal vein would average 40 feet in thickness. Here is material enough in the mountain to burn some years. It is now proposed to open the vein at the other end of the mountain, and save as much coal in that way as possible.

CABBAGE PLANTS.

From the Maine Cultivator.

A sure—but rather troublesome—protection of cabbage plants against the grub worm, is to go out into the woods and take off lots of strips of birch bark from small trees. These will naturally main-

tain the shape they sustained on the tree—round like a wafer box, without top or bottom. They should be about two inches high or deep. Let each strip enclose a plant, and press it gently into the earth. The grub can then neither crawl under nor climb over it. Look he ever so wistfully that way, he cannot set his teeth into the delicious fibres of the young cabbage stalk.

LIQUORICE.

From the Penny Magazine.

This plant, which requires a deep loamy sand, with a bottom of clay at the depth of three or four feet, is chiefly grown at Pontefract in Yorkshire. The properties for which the liquorice is cultivated are found in the root, which contains an abundance of mucilaginous juice, of a sweet and sub-acrid taste. The pectoral qualities of this juice are well known, and the Pontefract cakes, which are a preparation from the liquorice root, are in considerable demand, both in England and on the continent. These cakes are not so large as a shilling, and bear the impress of a castle. Liquorice is also a chief ingredient in lozenges and other medicaments taken for coughs. The liquorice plant being a native of the warmer climate of southern Europe, is not always a profitable crop in this country. Great care and good management are absolutely essential, and the land must be of superior quality, well manured, and stocked with choice plants, or the cultivator will not succeed in bringing them to perfection. A wet and cold summer is injurious, and an unfavorable season will produce only one fourth of an ordinary crop. The mode of cultivation in the liquorice-grounds at Pontefract is first to trench to the depth of three spades, the bottom to be loosened but not thrown out. Old stable-dung must then be spread on the land, in the proportion of from thirty to forty cart-loads per acre; and it must afterwards be well dug in. The land is then laid out in beds about thirty-eight inches in width, thrown up about a foot in height, and after being neatly raked over it is ready to receive the plants, which should be put into the ground in March or April. They are of two kinds, stock and runner-buds, and are dibbled in four inches deep in alternate rows across the ridge, one on the top, and one on each side, and longitudinally at the distance of six or seven inches. The beds are then carefully raked, the dibble holes being well covered in. The space between each row of plants is usually sown with early dwarf or York cabbages, or early kidney potatoes. The beds will soon require weeding, and this is done two or three times during the summer. In autumn the top, which is four or five feet high, is cut off near the bud. In the ensuing spring and summer the ground must be hoed and carefully weeded, and in autumn the tops, which are four or five feet in height, are cut down as before. The same management must be repeated each year, for the part of the plant above the surface grows annually, though the root is perennial.

About the third or fourth year after planting, the roots, which should be three or four feet long, are taken up some time between November and February. They are tied in bundles for sale, which is effected as early as possible, as they become dry, and of less value the longer they are kept.

IMPROVING LAND BY GREEN CROPS.

From the Farmers' Advocate.

Philadelphia, 3rd month 18th, 1840.

Dear Friend.—Soon after our return, I applied to a friend who has the reputation of being a skilful agriculturist, for his advice as relates to the best method of proceeding under your circumstances—his reply is now before me, and I know no better plan than to copy his letter; he says—

"My farm having been in a high state of improvement for many years past, I have not done any thing in the way of improving land by green manures, having a full supply from my barn-yard for all my wants; I can however say, when the latter cannot be had to sufficient extent, and where lime or marl is not to be obtained but at too great a cost. I would look as my chief dependence, to green crops, and from the experience I have had, would give a preference to corn for that purpose, sown broad-cast, say $1\frac{1}{2}$ to 2 bushels to the acre, not only on account of the greater quantity of saccharine matter contained in the corn stalks, but also on account of the greater produce to the acre, and the facility of covering it with the plough. I have, myself, made but one experiment with green manure alone, being generally in the practice of liming previous to sowing the grain,—in that instance I pursued the following course: about the 15th of the 5th month, after corn planting. I prepared the ground, and sowed $1\frac{1}{2}$ bushels of corn per acre, harrowed it in lengthwise—then across; the grain was well covered, I should however prefer covering with the plough *lightly*, when it can be done, and harrowed once to level the ground; as there was no rain for several weeks, sufficient to cause the grain to vegetate, not more than about one third came up, in consequence I considered it pretty much of a failure; what there was I had ploughed in when in tassel, as deep as I could, having first rolled it down with a heavy roller; after ploughing it in, it was again rolled, and so left until seeding time, when the wheat was sown broadcast and harrowed in; the land in this case was poor, yet a good crop of wheat was cut from it.

I have known several experiments made in my neighborhood, similar to the above, and always with good success. I will mention one case directly to the point: a near relation of mine had some poor land on his farm, that he said he could do nothing with, it was a light sandy soil; I proposed to him to fence off about five acres, and try the experiment of improving it by green manure alone; he laughed at the idea, but at my particular request submitted; the result was as follows: the first seed sown was oats, which grew to the height of 3 inches on an average; these were ploughed in, and again sowed in oats; this crop was about double; the 2nd year, again sowed oats in the spring—crop pretty good,—ploughed it in and sowed buckwheat, produced a fine crop which he cut; then ploughed the ground—sowed with wheat and cut a fine crop.—My wish was, that he should have continued the experiment for 5 years without cropping, but the improvement was so great, that the temptation to crop could not be resisted beyond the 2 years. I am decidedly of the opinion that poor ground can be made good by green manure only—but to do this the cropping must be *light*, until assisted by manure made from the grasses produced—I would prefer the

Dutton or northern corn for sowing, as it suckers more than any other, and ripens earlier—of course would admit of its being ploughed in sooner, which would give it more time to decompose."

The foregoing quotation gives the recommendation of my friend, which I am fully prepared to subscribe to. I may now say that I feel a lively interest for the promoting of the pecuniary advancement of my friends in North Carolina, as I am very much inclined to believe that important consequences are dependent thereon.

JOHN ELLIOT.

EXPLOSIONS IN COAL MINES.

Extract from the Edinburgh Encyclopedia.

To describe the catastrophe attending an explosion of an extensive coal-mine, would require the pen of an able writer, guided by one who has been present at such a scene; but some faint idea may be formed from the following description. We shall suppose a mine of great depth, perhaps from 100 to 150 fathoms, with the workings extended to a great distance, the machinery complete in all its parts, the mining operations under a regular and rigid discipline, with railways in every direction; the stoppings, passing doors, brattices, and the whole economy of the mine so arranged, that every part of the work is performed like a well regulated machine. To see a mine of this extent at full work is a scene of spirited animation, and of wonderful industry; the "sound of the hammer" is heard in every quarter, and the numerous carriages, loaded and unloaded, passing to and from the wall-faces to the pit-bottom are seen driving and thundering along in every direction. At each door, a little boy, named a trapper, is placed to open and shut it. Every one is at his post; added to which, there is a degree of cheerfulness pervading the whole scene, which could scarcely be expected in a place of so sombre an aspect. While the work is thus going forward, it has but too frequently happened, that, from some unforeseen cause, part of the ventilation has become stagnant, or laid dead, as it is termed, by which a great body of inflammable air is gathered into one place, or the sudden opening of a blower has produced the same effect, the certain consequence of which is, that the unsuspecting miner enters it with his candle; ignition takes place; "sudden as the spark from smitten steel," the whole extent of the mine in that direction becomes one blaze of light and flame from roof to pavement, in which the miners are enveloped. It hangs for a few seconds; then from the evolution of immense volumes of gases, with much heat, this pestilence begins to move with the violence of a tornado, and with the noise of thunder, directing its course always in the nearest direction to the upcast shaft. Its power is awful and irresistible. Whatever obstructs its course is swept onward like smoke before the wind. The stoppings are burst, the doors are shivered to a thousand pieces; while the unfortunate miners and boys who are within its range, with the horses, carriages, corves, and coals, are swept along with inconceivable velocity; and when a pillar obstructs the direct course of the current, they are dashed against it, and there lie mingled

in one common mass of ruin, desolation and death, as if they had been blown from an immense mortar against a wall! Others are carried direct to the shaft, and are either buried there amidst the wreck, or are blown up and over the pit-mouth: So powerful is the blast, that even in the shaft it frequently tears the brattice walls to pieces, blows the corves, which are hanging in the shaft, as high into the air as the ropes will allow them; and not unfrequently the ponderous pulley wheels are blown off the pit-head frame, and carried to a considerable distance in the midst of a thick cloud of coals and coal-dust brought from the mine by the volcanic eruption, which absolutely shakes the solid mass of earth that confines it. The dust rises to a great height, and sometimes obscures the light of the sun in the vicinity of the pit. No sooner is this part of the catastrophe over, and an awful silence produced, than the *back draught* commences, by the descent of air down the shaft to replace the air of the mine as it cools. Every part of the mine is filled with the most deleterious air, particularly azote and carbonic acid, the result of combustion. Those miners, who were in the direct line of the explosion, have their fate quickly sealed. Others who are not in the direct current are dreadfully burnt. But though the greater number of the miners are at a distance from either of these calamities, yet their fate is perhaps the most severe. They hear the explosion; they know well the certain consequences of it; every one thinks of his personal safety; and the great object is to reach the pit-bottom. All the lights are generally extinguished, and they have to pursue their dreary path in awful darkness—a darkness rendered terrible by the combination of uncommon circumstances. Some of them have been known to make most providential escapes, after clambering over fallen roofs, and the wreck where their fellow workmen lay entombed; but others, deviating from the direct course in the confusion of the scene, wander anxiously onward, dreading every moment to meet the returning pestilential air. At last they feel its power, and knowing the certainty of their fate, they cease to struggle with what is irresistible; they resign their hopes; fall down in a reclining posture; nature is soon exhausted, and they sink in death as if asleep! Such is the fate of the hardy and industrious miners, who venture their lives every day for the comfort of others: and such, frequently, is the misfortune, which, in a moment, comes like a whirlwind, upon the best arranged mining concerns, after the most laborious exertions, and the most unremitting anxious concern of the mining engineers. The labors and plans of years are in an instant destroyed.

Sad and melancholy as the scene described is, perhaps it is the least part of the melancholy picture. From the general arrangements of the collieries, it is found a matter of economy and convenience to have the workmen's houses, where their families reside, near to the pits. The consequence of this is, that the instant an explosion takes place, the alarm is general, and the wives and relations of those who are in the mine rush to the pit-mouth in a state of distraction, where a heart-rending scene takes place—a scene which may be imagined, but cannot be described. All the violent effects of sudden grief are the consequence. They look to the horrible pit where those who are

most dear to them are entombed, and who but a few hours ago had left them in health and vigor, with the hope of returning happy to their homes.

In such a case, the mining engineers have a severe and an imperative duty to perform. The pit, where they must descend, is either rendered dangerous by the wreck of loose timber torn away by the irruption, or the air is in a pestilential state; and, what is still more alarming, part of the coal may have taken fire from the explosion, or a blower may be ignited: either of which would produce repeated and violent explosions the instant the gas accumulated to that point so as to come in contact with the fire. Such a case is not unrequent, and against this no human skill can guard. This fearful case, with the others before mentioned, is probably combined. All these have to be encountered by the engineer and his assistants. The hope of saving some of the workmen from death, and the ardent entreaties of the agonized relations, place the consideration of personal safety out of the question.

On descending to the bottom of the pit, it is perhaps with great difficulty the mine can be entered, owing to the wreck; if the descending current of air is good, part of the wreck is cleared away. The engineer then considers what are the best immediate plans to pursue, arising from his experience, and an accurate knowledge, not only of the general situation of the workings, but of the direct lines of the air courses, so that he may in the shortest time restore the ventilation, and, if possible, relieve the miners who may yet be alive. Having formed his plans, he states them to his assistants, and hears any improvements they may suggest; a great quantity of prop-wood and brattice deals are sent down, and they enter the mine as far as the air will allow them; care being taken to have it with them every step as they proceed, and in particular before leaving the shaft, they see that the brattice of it is air-tight; for if any openings are in it, the air would pass directly through it and ascend to the bank.

As the violence of the explosion destroys many of the stoppings, and almost every door upon the air-courses, the whole circulation is laid dead, and the fresh air will of course take the most direct course through the first opening to the upcast shaft. All these must be replaced as they proceed forward with the air; and this work being in general executed with astonishing quickness, many lives are frequently saved.

As soon as the ventilation is restored by these temporary brattices, the stoppings and doors are replaced in a substantial manner, and the workings are resumed with all their former vigor and activity, as if no misfortune had ever happened. From what is stated, it is evident, that the stability of the main stopping, is an important point, on which account it is counterforted by strong walls of stone; and if stones are easily procured in the mine, it is of great service to counterfort as many of the stoppings as can conveniently be done, so as to resist the explosive force of the fire, and give a greater facility in recovering the ventilation in the promptest manner. The oversmen and deputies who are employed in this service show a wonderful dexterity in placing temporary brattices. They will work in the dark, with the wreck of one destruction around them, and threatened every moment to be overwhelmed in ano-

ther, in which the hope of saving a fellow-workman from death, gives the most lively energy to their actions; and if they think that a bold effort will save life, they will rush without fear into the midst of pestilential air, and grapple with death. The mining engineers are always at the head of this service, and as they, with their assistants, frequently push forward in the dark, they are exposed to the deleterious effects of the gases, and it is no uncommon thing for those who take the lead, to drop down lifeless, while those who are in the rear seize them by the feet and draw them back into better air, yet no sooner are they re-animated, than the same generous impulse acts in its full force, and they make the same attempt again and again, till nature is exhausted. We need scarcely add, that many fall a sacrifice to the ardor of their generous exertions.

When it is ascertained that fire exists in the wastes, either by the burning of the small dusty coal which lies along the roads, or that the solid coal is on fire, from the ignition of a blower, the descent into the mine is rendered tenfold more hazardous, as a moment's safety cannot be depended on; for if the discharge of gas is great, it rapidly accumulates, and the instant it reaches the place where the fire is, an explosion again takes place, and that repeatedly as long as the causes exist. There have been instances of this kind where the most violent explosions have taken place, regularly within the space of an hour, and continuing to do so for thirty-six hours, each irruption vomiting out of the pit-mouth like a volcano. In such cases, no man dare attempt to go down, as his destruction would be inevitable. As the case is desperate, desperate remedies must be applied, which are, either to mount up all the pits and exclude the air, or if this is not practicable, the colliery must be laid in and drowned, by allowing the water below ground to accumulate; and to aid the common growth, the tubbing in the shaft is tapped, and all the body of water from that quarter sent down: when the fire is extinguished, the colliery is refitted in the usual manner.

When fire exists in the waste, with less apparent hazard of life, the mining engineers, with their assistants, descend with portable fire-extinguishing engines. These are placed as near the burning matter as possible, and by playing upon it, the fire is speedily extinguished. It frequently happens, however, that although they see the fire before them, the state of the air prevents them from approaching near enough to allow the engines to play with effect. To remedy this, Mr. Buddle, with that ingenuity for which he is so conspicuous, conceived that the concussion of air which is produced by the discharge of artillery, might be effective in extinguishing fire, which could not be approached with the engines. He accordingly had small cannons made, and by charging them with powder only, and approaching as near the fire as possible, he has succeeded in blowing out flame by repeatedly firing them. This principle has been proposed lately for extinguishing houses which are on fire.

Such is an outline of the misfortunes incident to coal-mines, and to the engineers and workmen employed where inflammable air abounds.

In the manner before described, and with daily misfortunes of a lesser or greater degree, were the collieries of Great Britain carried on, every one

struggling against the direful ravages of the inflammable air; but it baffled the skill of the most experienced engineers, and all the precautions of their most unwearied diligence and anxious attention. The general question, and anxious inquiries were: Can no remedy be devised to avert these awful calamities, to deliver an industrious class of society from such desolating catastrophes? Many plans were proposed, but they were altogether inapplicable. The first person who stepped forward, a number of years ago, and wrote upon the subject, was Dr. Trotter, of Newcastle. He published a pamphlet, wherein he proposed to neutralize the carburetted hydrogen as soon as it appeared in the mine, by chemical agents. Every praise is due to him, for his very humane intentions, and earnest endeavor to remedy an evil so great. But although the principles he brought forward were consonant with sound philosophy, and were practicable upon a small scale, they were totally inapplicable to the extended workings of a coal-mine, where there were excavations of many hundred acres, and where the issue of gas was not only incessant, but in great abundance; hence, the principle was not only inapplicable in a general point of view, but the expense of the neutralizing substances must have been so great, even had the principle been applicable, as to render the plan altogether out of the question. After Dr. Trotter's pamphlet, nothing particular appeared for years upon this important subject, the mining engineers, therefore, applied their whole skill and energies in producing a circulation by the means before mentioned, particularly upon the principles of rarefaction and exhaustion by fire.

In some cases, fish, which in the incipient stage of putrefaction, give a strong phosphoric light, had been tried to give light to the miner in very dangerous cases; and the light produced by the collision of flint and steel was universally employed, when candles could not be used without producing an explosion. The machine for producing this light is named a steel mill, which will be particularly noticed afterwards. Philosophers proposed the various kinds of phosphorus, but these were altogether insufficient for the purpose. When tried in the mines, they only produced a most melancholy light, and rather tended to render the "darkness visible." In the mean time the mines were extended, and the melancholy catastrophes constantly increased. At last an explosion and catastrophe took place at Felling colliery, near Gateshead, in the county of Durham, about a mile and a half distant from Newcastle, more dreadful and melancholy in their consequences than any which had ever taken place in the collieries of Great Britain. This colliery was working with great vigor, and under a most regular system, both as to the mining operations and ventilation; the latter was effected by a furnace and air-tube placed upon a rise-pit on elevated ground, south from the turnpike road leading to Sunderland. The depth of the winning was above 100 fathoms; twenty-five acres of coal had been excavated, and such was the execution of work, that from one pit they were drawing at the rate of 1700 tons of coal weekly. Upon the 25th May, 1812, the night-shift was relieved by the day-shift of miners at eleven o'clock forenoon, one hundred and twenty-one persons were in the mine, and had taken their several places, when, at half-

past eleven o'clock, the gas fired, and produced a most tremendous explosion, which alarmed all the neighboring villages. "The subterraneous fire broke forth with two heavy discharges from the dip-pit, and these were instantly followed by one from the rise-pit. A slight trembling, as from an earthquake, was felt for about half a mile around the colliery, and the noise of the explosion, though dull, was heard at from three to four miles distance. Immense quantities of dust and small coal accompanied these blasts, and rose high into the air, in the form of an inverted cone. The heaviest part of the ejected matter, such as corves, wood, and small coal, fell near the pits, but the dust borne away by a strong west wind, fell in a continued shower to the distance of a mile and a half from the pit. In the adjoining village of Heworth it caused a darkness like that of early twilight, and covered the roads so thickly, that the foot-steps of passengers were imprinted in it. The heads of both shaft-frames were blown off, their sides set on fire, and their pulleys shattered in pieces. The coal-dust ejected from the rise-pit into the horizontal part of the ventilating tube was about three inches thick, and soon burnt to a cinder; pieces of burning coal driven off the solid stratum of the mine were also blown up this shaft."

Such were the fearful and volcanic effects in the mine and atmosphere; but we have yet to state the result of the melancholy catastrophe as regarded the unfortunate miners. Of the 121 persons in the mine, at the time of the explosion, only 32 were drawn up the pit alive; and of these, three died within a few hours after the accident. Thus were no less than 92 persons killed in an instant by this desolating pestilence. The scene at the pit-mouth cannot be described.

The viewer, with his assistants, instantly descended, in the face of the most imminent danger, eager to save, if possible, any of the workmen; but the mine was found to be on fire, and they durst not proceed. In consequence of this fire, another explosion took place, and no alternative was left but to shut up the pits, and extinguish the fire, which was accordingly done. The pits were, after a considerable time, again opened, but it was the 19th day of September, before the complete ventilation was restored, and the last of the bodies of those who had perished was found; a period of 117 days from the day on which the accident took place. A minute account of this accident was published by Rev. John Hodgson, the worthy pastor of Heworth; who, upon this melancholy occasion, attended most assiduously, and performed the most painful duties amongst his suffering people. From his account of the misfortune, the particulars above stated are taken.

This fatal misfortune at Felling, roused the minds of every one connected with coal-mines, in order to find, if possible, a remedy for preventing such catastrophes.

It appears that Dr. William Reid Clanny, of Sunderland, who, from his medical profession, had frequently to attend the neighboring collieries, when the workmen were hurt by the explosions of the gas, had, in the year 1813, turned his attention to the construction of a lamp which would burn amongst inflammable air, and, though an explosion might take place in the lamp, would not communicate flame to the external surrounding

air. This he accomplished by means of an airtight lamp with a glass front, the flame of which was supported by blowing air from a pair of small bellows through a stratum of water in the bottom of the lamp, while the heated air passed through water by a recurved tube at top. By this process, the air within the lamp was completely insulated from the external air; and it appears that this was the first lamp that ever was taken into a body of inflammable air in a coal mine at the exploding point, without producing an explosion of the surrounding gas. Dr. Clanny made another lamp upon an improved plan, by introducing into it the steam of water produced from a small vessel at the top of the lamp, heated by the flame. For these inventions, the doctor twice received the thanks of "The society for preventing the accidents in coal-mines;" and he also received the silver, and afterwards the gold medal from the Society of Arts, in London. Although these lamps, invented by Dr. Clanny, were upon philosophical principles, displayed much ingenuity, and were absolutely safety-lamps for mines, yet their construction prevented them from being generally used. Nevertheless, Dr. Clanny deserves every praise for his labors and very zealous exertions in the cause of humanity. It appears that nothing farther was attempted in this important matter, until the accident at Felling colliery, as before noticed, when Sir Humphrey Davy, Mr. James Stevenson, engineer, Killingworth colliery, Newcastle, and Dr. John Murray of Edinburgh, brought forward safety-lamps, in the year 1816, each constructed upon different principles. Sir Humphrey Davy's lamp was made of fine iron wire-gauze, without any glass; that of Mr. Stevenson's was made of a strong glass cylinder, having a metal plate at top, and another at bottom, perforated with very small holes, to permit the air to pass to and from the lamp; and that of Dr. Murray was a glass lamp, or rather lantern, to which good atmospheric air was brought by means of a long leather pipe from the air-course. Of these, Dr. Murray's lamp was not applicable but in a very few cases; the lamps of Sir Humphrey Davy and Mr. Stevenson were both complete safety-lamps in their principle, and are applied in practice; but that of Sir Humphrey Davy is decidedly the best, and is generally used in Great Britain. Having no glass, it is not easily injured, and sufficient light for the miner passes through the wire gauze. To each of the gentlemen, the world is highly indebted, and in particular, the mining interest of Great Britain, for their individual exertions.

The safety-lamp of Sir Humphrey Davy was instantly tried, and approved of by Mr. Buddle, and the principal mining engineers at Newcastle. No one was more zealous to prove its safety, and introduce it into the mines, than the Rev. John Hodgson, of Heworth, before mentioned. He descended the mines, entered amongst the inflammable air, and fully satisfied himself of its absolute safety, in order that he might induce the miners of his parish to use it, half of whom he had seen so lately swept away by the dreadful explosion before narrated.

The invention of this lamp has produced a new era in the coal-mining of Great Britain. The steel mills were very expensive, and in certain cases produced explosions, whereas the safety-lamp can be carried without danger amongst in-

flammable gas ready to explode; and, although the wire becomes red-hot, an explosion of the gas will take place inside of the lamp, without communicating inflammation to the external gas. While we very much admire the great ingenuity of the highly celebrated inventor, we are not less astonished at the uncommon simplicity of the construction.

RAT-CATCHERS AND RAT CATCHING.

From the Penny Magazine.

Part of what the American ranger said of the bear (Washington Irving's 'Tour on the Prairies') may be applied in our island to the rat—it is the "knowingest vermin" of any creature we have. Its sagacity and cunning are really extraordinary, and its daring courage remarkable for an animal of its size. Yet though almost every person can produce a budget of stories about the catching and killing of rats, how few are there who have accurately observed their habits! We may often see people carefully baiting traps in a place where rats are swarming, and marvelling that none can be tempted to enter, when the simple reason is, that from want of a little consideration the sagacious instinct of the beast is a match for the awkward attempts made to capture it. The truth is, we too cordially detest the rat to spend much time in watching its habits. It is, to the greater number of us, in every sense of the word, an "unclean" creature; and the prevailing thought is, not what are its habits, for some of these we know too well by the destruction it causes, but how soon we may get it exterminated or chased from our premises.

The rat belongs to the order *rodentia* of Cuvier, the *gliræ* of Linnæus. This order is characterised by two large incisors in each jaw, separated from the grinders by a vacant space, and destitute of canine teeth. Some of the genera have the grinders with flat or ridged crowns, others with blunt tubercles. They feed generally on vegetables, but the species with tuberculated grinders are nearly omnivorous. The number of genera in this order is considerable. We have, in Britain, the common mouse, the field mouse, the harvest mouse, the black rat, the brown rat, the water and field lemming, &c. *Mus rattus*, the black rat, is characterised by the body being black above; while *mus decumanus*, the brown or Norway rat, has the upper part of the body covered with light-brown hair, and whitish underneath. But localities, food, and age cause considerable varieties in the external appearance of our rats.

The brown rat, now the common rat of our island, is a comparatively recent importation into this country. But the time and manner of its importation cannot be ascertained. Its original country is said to be Persia, though now it is spread over the world. Stories have indeed been gravely told about an original pair or pairs having been brought over in some vessel from Norway (hence the name of Norway rat,) from whence the stock proceeded that now swarm in Britain. It is possible that such may have been the mode of their introduction, but that is all we can say about it. It appears to have attracted attention about the middle of last century, as multiplying exceedingly

fast, and as driving the black rat before it—at least thinning its numbers. But the brown rat aids in keeping its own species in check, a large rat being the terror of its weaker companions. Yet ferocious as they are, having no objection to prey on one another in lack of other provender, the female rat manifests strong maternal instinct, taking up its young and running with them to some supposed place of shelter on an alarm of danger, such as the turning of a ferret into their holes. They breed three times a year, producing from ten to twenty in a litter.

The antagonists most dreaded by the rat are the common weasel and the ferret. These little creatures, in proportion to their size, are more blood-thirsty and daring than the most tremendous of the rapacious quadrupeds. A cat or a dog cannot follow a rat into his hole, and a rat will defend itself against either with something of its natural courage, as long as there is the least chance of successful resistance. But to use a common phrase, it's "heart sinks" at the sight of a ferret. It will not die so helplessly submissive as a rabbit does when assailed by a weasel or a ferret, for in all circumstances a rat will die snapping and biting if it can. But turn a single ferret down a rat-hole, and the alarm and horror it creates is soon manifested. The rats fly wherever they can, the ferret pursuing and darting at the neck. The ferret does not always escape without savage wounds, for rat-catchers sometimes recover the animals they employ with such tokens of their conflicts as the loss of an eye. This superiority of the ferret over the rat is not to be attributed to mere superiority in strength, for a ferret is generally not above 14 inches in length, exclusive of the tail. But it is a resolute and dauntless creature, and not to be intimidated by a bite or two. The moment it fastens on its favorite spot, the neck, its victim is secured, for it cannot be shaken off till it has drained the life-blood. All regular rat-catchers therefore keep a number of ferrets for their occupation. The rats that fly to the mouth of the holes are killed by the dogs, while those who cannot escape meet a similar fate from the ferret. But they do not employ ferrets in places where there is a chance of losing them by drains or sewers. They set traps or use poison, and being well acquainted with the habits of the creatures they are employed to destroy, are enabled to catch or kill them with more success than others. Thus they are careful in mixing their poisons or baits to leave no scent which the rat may detect so as to rouse its suspicion, and they employ a little of some of the oils for which rats have a strong predilection. One of three, as is well known, is the oil of rhodium. A bait scented with it will draw a rat into almost any trap, if the person who has handled it is careful not to leave behind a scent or flavor of his hands. A mixture made up in the following proportions has been very effectual:—a quart of oatmeal, four drops of the oil of rhodium, a grain of musk, and two nuts of nux vomica powdered. But, of course, caution is requisite in the employment of poison; and those who do not wish to have the comfort of their houses affected, will think of what may follow if a poisoned rat dies behind the wainscot. A little perseverance will frequently drive away rats from a dwelling-house, if care is taken to block up their holes with broken glass, &c.,

and plastering them over, repeating the process wherever a new entry is made. If the house is in a country place this may be done during summer, when the rats generally take to the fields. But in large establishments, where they can find food in abundance, and great facilities for shelter, it is very difficult to get rid of the pests; all the ordinary means are frequently found to fail, such as the use of traps, poison, ill-treating a rat and letting it off, &c. The following little narrative contains a few particulars of what frequently occurs when the attempt to exterminate rats is not managed properly.

In a large establishment, where many men and boys were employed, a colony of rats grew to such an extent as to become a seriously destructive pest. Much time was lost every morning in repairing damages inflicted on work during the preceding night by these destructive gnawers; and though for a time poison seemed to have some effect, it lost its power, for the rats impudently dragged out the dead bodies of their comrades, leaving them in the court-yard, or on the floor, and then, instructed by their instinctive sagacity, refused to taste anything which their sense of smell told them had poison mixed with it. A number of cats were kept, but they were comparatively useless, for they either slept during the night, or, overawed by the number of their antagonists, did not attempt to give them much molestation. Traps were also employed, and for a time were useful in diminishing the numbers of the rats. Every morning many prisoners were found in them, most of them however being either young or not full grown, for the old rats were wary in committing themselves. The watch-dog, being an admirable rat-killer, was employed to destroy the prisoners; and it became a regular piece of sport to open the traps in the yard, and admire the dog's slaughtering dexterity. In fact, so exciting did this sport become, that many a lazy fellow, young and old, noted for their habits of lagging in after the regular hour of commencing work, now became "early risers," and thronged with the rest to enjoy the fun. The dog was not only a dexterous but a humane slaughterer. He gave no unnecessary torture; never tantalized his victim while it lived, nor "worried" or mangled the body when dead. If half a dozen rats were turned out at once, he wheeled nimbly about, caught each by the nape of the neck, disabling it with a bite, and having thus prevented their escape, he would deliberately return, going to each in succession, and extinguish life by another bite or two.

But poison, traps, cats, and dogs seemed all ineffectual. The rats refused to enter the traps, and the regular morning's sport became scanty and unexciting, while the damage done during the night continued as much as ever. Ingenuity was baffled, for the rats improved remarkably in cunning. There were some windows that overlooked a place where rubbish and garbage were thrown. This was a central feeding-place for the rats, and during the day considerable havoc was committed by the discharge of mimic arrows, many of the boys being provided with little bows and arrows, with which they amused themselves, often when they should have been attending their employment. During the dinner hour, when all was still, first one head, and then another, would ap-

pear at the mouth of the rat-holes, the sharp cunning eyes carefully scanning the windows above, to see if there was any danger before venturing out. By-and-by, if all continued quiet, one or two young ones would emerge, followed by a few more, but the old ones would rarely trust themselves out without a long continued assurance of peace and safety. Even the young ones learned caution. Amongst other expedients, a box was balanced on a stick, with a bait inside. One morning the box was discovered to be down, but the floor round about was strewn with chips. A rat had pulled the box down upon himself, but he scorned to be kept a prisoner. He had gnawed the floor, scooping out a channel, and then cut out an archway in the side of the box, through which he had walked out.

It was suggested to the head of the establishment, that if he would cause a live rat to be smeared with some offensive ingredient, and then turned off, its smell would so annoy the others, as to make them shift their quarters. It was done, but the rats did not choose that their whole body politic should be upset because one unlucky vagrant was ill-flavored. Whether he was killed, or merely expelled, did not appear. Another experiment was tried—a cruel and a hazardous one. A large rat, daubed over with turpentine, was set fire to, and suffered to go off, its body smoking, and a long piece of cord being attached to its tail. It was found about a week afterwards in the courtyard, having been killed during the night by the dog. It had nipped its tail off, close to the body, in order to get rid of the cord, and seemed to have been recovering from the effects of the useless and dangerous mode of torture to which it had been subjected; but whether or not it had lost "caste" amongst its acquaintance and neighbors, and had become a wanderer, could not be ascertained.

At last a rat-catcher was employed, and it was amusing to remark the quiet mysterious air with which he affected to go about his business, and the contempt he manifested towards all dabblers in the science of rat-catching. He came with his ferrets and his dogs, and began his operations in an out-house. Presently the barking of the dogs told him that there were rats below, and taking a ferret from his bag, he let it descend. In a minute or two, a squealing announced the alarm and dismay which the presence and assault of the ferret had caused; and the rat-catcher, giving the word of command to his dogs, "Stand!" set each to guard a separate hole. Several rats now sprang out, and were killed, and a considerable number were killed by the ferret, which was some time before it re-appeared, having stayed below to gorge itself. The rat-catcher was employed for about a week, during which time he destroyed a great number. On some part of the premises he would not let his ferrets loose, fearful of not recovering them, if they entered a drain or sewer. There he employed poison and traps, and was certainly very successful in capturing. He did not exterminate the colony, but he seriously thinned its numbers.

A rat-catcher usually agrees with a farmer or country gentleman to keep his house and grounds free from rats for an annual payment, or else he is paid so much for the particular job. The first mode of payment is, of course, the most satisfactory to a man who follows rat-catching as a pro-

fession, as it constitutes one of his certain dependencies for a livelihood. One rat-catcher, who lives in the neighborhood of London, states that he usually keeps from twenty to thirty ferrets, which he feeds with rats. A thoroughly trained ferret, when let loose, will kill as many rats as it can, and return to its keeper, but one not so docile often stays a long time in the rat-holes, feeding on the animals it has killed.

The individual rat-catcher to whom we have alluded mentions that, on one occasion, he turned a ferret into a rat-hole in a barn, when he heard the usual signals of distress, evincing the havoc it was making. After having waited a long time, he heard a sound, as if the ferret was uttering a stifled kind of moan, and being anxious to ascertain the cause, he got a board to be lifted, and found that the ferret had completely blocked up the passage behind it with the bodies of the rats it had killed, and was suffocating for want of air. When a ferret is employed to turn out rabbits, the rat-catcher secures its mouth by a stitch on each side.

The voracious and destructive habits of the rat not only make it a great pest wherever grain is housed or stacked, but cause it to be disliked generally wherever it makes its appearance. We can almost tolerate a mouse in the drawing-room, when the appearance of a rat in the kitchen creates a shudder of horror. A thoroughly-domesticated cat usually declines a combat with a full-grown rat, though we have seen a kitten assail a rat nearly as large as itself, unsuccessfully yet courageously. But rat-catchers know that localities have great influence on the savage nature of rats—a rule, in fact, which holds with all savage animals, large and small. In places where they are not much hunted and scared, rats are cunning and timid, and a person who has nerve and dexterity enough to seize one with his hand will sometimes find them so overcome with fear as scarcely to attempt to bite. Thus we have seen a boy (and doubtless many persons have witnessed similar feats) seize a large rat, raise it in the air, and dash it on the ground. But wherever they are in considerable numbers, and are not much disturbed, they are audacious and fierce, and bite wickedly and cruelly.

FAILURE OF LATE BROODS OF SILK-WORMS.

From the Journal of the American Silk Society.

August 12, 1840.

GIDEON B. SMITH, ESQ.

Dear Sir—By common consent, the cultivators of the silk-worm look to you for information on all matters connected with silk culture. From the experience of the present season, it is obvious that we have much to learn, though it cannot be denied that much has been achieved. In my district of country, and as far as I have heard from, more remote parts—and my information has been quite extensive—the early broods of silk-worms were healthy without scarcely any exception. If there were exceptions, they were owing to tainted eggs. Not only was the result satisfactory and encouraging in cases where the rearings were judiciously conducted, but there have been equally successful rearings where almost every rule of

good management has been disregarded. There is then great cause for congratulation, thus far. But as the season advanced, success became less certain. For a while the worms would do well until the moment of moulting, when they would nearly all die off. Subsequently they would become diseased at an earlier age; and now, very few are found to survive the second moulting.

Although the season has been exceedingly unfavorable, it is impossible to ascribe all the disasters to it. It only requires a little extra trouble and care, to obviate all the disadvantages of weather. Being deeply interested in the business, and having observed its progress very closely, I am clearly of opinion that the eggs have gradually become contaminated by the process of retarding. The inquiry then naturally arises, whether retarding is necessarily injurious to the good quality of eggs? Is there no mode by which the hatching impulse can be arrested without imparting a taint to the constitution of the embryo, which no subsequent treatment can overcome? It is to the consideration of this inquiry that I wish to direct your attention. You have facilities, not only for diffusing but for collecting information, which no other man possesses; and I beg leave to suggest that the debt of gratitude which the community now owes to your public spirit and patriotism, would be still further increased, if you would investigate this subject, and make known such plans as have been found to succeed, of preserving the eggs for successive crops.

At the commencement of the present season, I was full of expectation and buoyant with hope. My first crop of cocoons were equal in quality to any I have ever seen. I thought I had some reason to look forward to continued success; for I had a large number of what I estimated the best eggs, carefully deposited on ice in January, perfectly secure from moisture, and kept at a temperature ranging from 37 to 47 degrees. Up to the present time their vitality is not in the least impaired; for they hatch with the greatest uniformity in nine or ten days after exposure. The worms are active and hearty until the first moulting; but as they approach and emerge from this state, they spread a thick tissue of web over the litter, covering themselves with it, and with some difficulty escaping from it at the commencement of the second age. The appearance of this web I have come to regard as an unerring symptom of debility. From the time of the first moulting, the worms begin to rapidly disappear; and few or none long survive the third change.

The disappointment occasioned by these losses has been very grievous; but believing that there is a remedy, and having undiminished confidence in the practicability of silk culture, I intend to persevere with renewed energy. P.

PRESERVATION OF CABBAGES.

From the Albany Cultivator.

The following methods of preserving cabbages for winter use are the result of experience.

The cabbages should be gathered before injury is done them by the severe fall frosts; the heavy outside leaves should remain on the stalk. Fix a string or cord round the stump near the roots,

suspend from the sleepers with the heads downward in a cool cellar, and they are ready and fit for use at all times. Cabbages kept in this manner retain all their peculiar flavor and sweetness; the whole virtue of the stump and leaves is concentrated in the part which is used, are handy of access, occupy but little room which would be occupied by other purposes, and seldom if ever rot; the outside leaves wilt and contract, and in time become quite dry, which form a sort of coating that serves to exclude the air from the inside of the head.

Another method practised by some, and highly recommended, is to cut the head from the stump, pack close in a sack, taking care to fill up the vacancies with dry chaff, thereby excluding the air, and keep in a dry cellar.

CATERPILLAR IN THE COTTON.

From the New Orleans Bulletin.

A letter, dated 12th August, written by an intelligent planter at Hope, in the Red River district, and received by the Bogue Home, which has been handed to us by a commercial house of the city, says:—

"We have terrible reports of the caterpillar; that they are sweeping every thing on Bayous, Bouf and Robert, and on the river. On this Bayou I hear they are very bad at Dick's, Whillington's, Manader's, Roger's, Davison's, Gordon's and Texada's, below me; and at Winn & Neall's, Davidson & Hale's, Bullard & Clanton's, and Gray's, above me. In my own crop, I discovered a few; but they sometimes spread so fast as to spread over a whole crop in a week; and cotton, in which they are now pretty general, cannot make, under the best of circumstances, more than half a crop. J. Brown told me that a part of his Johnston plantation looked precisely as if it had been burnt. I am told Smith W. Gordon, who you know is a very shrewd man, and who ought in a fair season to make 250 bales, says he will give his crop to any one for 50 bales.

TARRING TREES TO PROTECT THEM FROM THE CANKER WORM.

From the Yankee Farmer.

A gentleman, who has had some experience in the business, considers the tarring the cheapest and an effectual remedy against the canker worm. He says that their ravages may in this way be prevented with an expense not exceeding one-fourth or one-half of the interest on the sum necessary to protect trees with troughs.

This year he had about fifty apple trees on his place, which he occupied for the first season. Last year nothing was done to destroy the worms, and they were very numerous, destroying all the foliage on the trees; so that he commenced operations under unfavorable circumstances, for with proper care annually their ascent upon the trees would have been prevented, and of course they would have been much less numerous.

In the spring he cut stout brown paper into strips of five or six inches, tarred one side of the

paper and then put them round the tree, with the tarred side next to the tree, which caused it to adhere. Then he tarred the paper outside.

With the aid of a boy he tarred the fifty trees in this way in a very short time, and the boy put on tar every day until the season for the worms was over. This daily operation required but a few minutes every time. The whole expense was but a trifle—no more probably than would be required in managing with the tin or leaden troughs after they are on the trees.

The trees in this case were well protected, though a few worms were on the trees, probably from eggs that were laid by grubs, that ascended the trees in the fall or in pleasant days in winter.

These did no material injury. To prevent this small evil it would be well to tar in the fall, and also in warm days in winter, and in the spring it should be attended to daily till the season for the worms to ascend is past.

In the case here named the worms were so numerous that they would sometimes form a bridge almost across the tar in one night. If this or any other good method of destroying canker worms was carefully pursued by all who have orchards, these depredators would soon become scarce, and with little trouble their ravages would be almost entirely prevented.

EXPERIMENT OF DEEP TILLAGE AND BREAKING THE ROOTS OF CORN.

To the Editor of the Farmers' Register.

Little Rock, Ark., Aug. 15, 1840.

In the May and June numbers of the Farmers' Register, I see some remarks upon the culture of Indian corn. I have long thought it strange that this valuable plant had received so small a share of scientific attention. We are in the practice of planting and cultivating as our fathers have done, without once supposing that the cultivation of corn could be improved. The object of these lines is not, however, to discuss this subject, but to state a fact in relation to root-breaking, &c.

In April, 1834, I planted a small lot of corn. The soil was a light silicious soil, with a red clay subsoil. I planted in hills at the distance of four feet. The plough I used was a single coulter, made of an inch and a half bar. With this simple instrument, (for I used no other,) I cultivated my corn. The mode of using it was to run with in four inches of the corn-plant's, and not less than seven or eight inches deep. This was performed both ways, crossing at right angles eight inches apart, the corn being in the middle of the square. This severe and apparently destructive operation was repeated four times during the growing of the corn. The summer was very dry and warm, my land quite arid. Notwithstanding, my corn-blades did not twist at any time, which was a subject of remark at the time. In the month of September, I had a part of the corn cut off to make room for a building; when digging the foundation I found roots more than 20 inches below the surface. This was, no doubt, the reason of the vigorous growth of the corn, the subsoil being more moist than the surface, gave nourishment to the stalks. The inference that I and one or two others drew from the fact, was, that by cutting the roots and

keeping the soil open and loose, the roots assumed a vertical instead of a horizontal direction. Violent agitation of the earth about, and even breaking, the roots of many other kinds of plants, is by no means injurious. The tobacco, when about to stop its growth, if it be pulled so as to break many roots and start the whole plant, will give it new vigor. (This must be done during rain.) A wound on trees, and even cutting away the whole of the old wood is often beneficial. These remarks are made for the consideration of those who may have more information than I have. The whole may be a mistake, or an exception to a general rule.

I design giving, at some future period, a general description of the soils, natural productions and resources of our state. I greatly desire to have a full set of your Register, but must defer for a while.

Respectfully,
W. W. STEVENSON.

THE PROPER CULTIVATION OF, AND ANNUAL CROPS FOR PEACH ORCHARDS.

To the Editor of the Farmers' Register.

During the last twenty some odd years, a communication has been almost annually going the rounds of agricultural papers, the production of a worthy man and a zealous, enterprising agriculturist of Pennsylvania, a Mr. Colter, on the subject of cultivating the *peach tree*.

Many years ago, I determined on the cultivation of that fruit, with a view to distillation and the fabrication of brandy; but, before my orchard had become productive, as the result of observation and much serious reflection, I determined that, next to original sin, ardent spirits was the greatest curse on earth; and, consequently, determined to find some other outlet for my little portion of industry and enterprise, less objectionable. Passing through Virginia and North Carolina about the same time, I found to my agreeable surprise that, as an article in the production of *animal food*, the peach, if judiciously selected, and managed, was not excelled, when every thing was taken into view. I found, however, that the method suggested by Mr. Colter was opposed to a judicious and economical management of both fruit and soil.

About the last of July, I found my little orchard cultivated on this gentleman's plan perfectly prostrated—the trees lapped—it was painful to go through it—and the load of fruit lying on the ground, part amongst the grass and weeds. For to give the soil that degree of cultivation necessary to keep it clean, was impossible.

I became still further satisfied, from facts before me, that the ground amongst fruit trees cannot be kept too loose, or too clear of grass and weeds. I determined, therefore, that some ameliorating crop must be found and annually cultivated among my fruit trees to insure good fruit, and abundant crops, as also lasting trees. In selecting this crop to carry out my plan, which was to raise the peach for the production of pork, I found that some of the pea tribe, after the trees arrive at the bearing state, and the potato, previously, were the only plants unobjectionable; and I found in this section of the union varieties of both, fully answering my views,

coming to full maturity, as the peaches began to ripen in June. I found a pea that produced admirably, and even under the trees, running up their bodies, spreading through the limbs and bearing well—and uninjured by the winter rains. And here, I will add, as the result of no slight experience, that, notwithstanding the peach tree is so highly benefited by stirring the earth around its roots, to produce the best effect, it must be done only in the fall, winter, and in the spring after the blossom is off. And, to settle this part of the subject, as far as regards my practice, I will state, that as soon as the vines of the potato or pea cultivated in the orchard, are sufficiently rotten to turn under with the bar-share, the first ploughing takes place, the next previous to planting, and the last on the cultivation of the crop. I am fully satisfied that the roots of the tree require to be kept cool and at rest (when the tree is in the bearing state) the balance of the summer, for which the only two crops I can admit, are admirably calculated. The little bunch potato comes to maturity with us in June, and produces admirably. The vine hardly runs, but covers the earth with a mass of leaf and short vine. Not wishing to take up too much of your valuable columns, I will continue the subject in other numbers.

CULTIVATOR.

Alabama, 1st September, 1840.

Our correspondent need not entertain the fear expressed in his last sentence. We should be glad to have him a frequent contributor to our pages, and to occupy as much space as his leisure may permit. His present subject is one of much interest, and the more fully in detail his practical experience shall be stated, so much the better. Judging from his southern locality, we presume that he speaks of the *sweet* and not the Irish potato.—ED. F. R.

REELING SILK IN PHILADELPHIA.

From the Journal of the American Silk Society.

At the model filature in Philadelphia, we learn from an article in the United States Gazette, the following has been the result of practice:—

Elizabeth Williams began learning to reel silk on the 9th of last month, (June.) July 15th commenced at half past 8 o'clock, and reeled her bushel of cocoons by 3 o'clock in the afternoon, having had a recess from 12 to 1 o'clock. Obtained from the bushel 20 ounces and a half, and continuing her work till 6 o'clock, P. M., reeled 28 ounces in the day. The cocoons were of the pea-nut variety, and very good. The silk 25 fibres.

On the 16th, the same girl reeled from similar cocoons, and without any extraordinary exertion, 2 pounds and 1 ounce of 25 fibre silk, between the hours of half past 7 A. M., and 6 P. M.

Hannah Hill commenced learning to reel May 27th, (of this year,) and obtained from her bushel of pea-nut cocoons, 22 ounces. In the course of the day she reeled altogether 24 ounces of 25 fibre silk.

Cornelia King began learning July 1st, and only

about a fortnight afterwards, namely, on the 16th of July, got 18 ounces of 25 fibre silk from one bushel of pea-nut cocoons.

In the silk filatures in Europe, from one to one pound and a half is considered the daily task of an experienced reeler. FRANKLIN.

RHODE ISLAND AGRICULTURE.

Extract from the Geological Survey of Rhode Island, by Dr. C. JACKSON.

Report of the Crops, &c. raised on the Rivulet Farm, in Cranston, 1839.

The land consists of 15 acres under tillage,
 75 ' in grazing,
 15 ' clover meadows,
 25 ' watered
 30 ' river
 50 ' in wood,
 10 to 15 ' peat bog,
 5 to 10 ' unreclaimed.

Stock.

15 cows,	\$570	2 horses,	\$110
1 bull,	25	21 sheep,	63
1 pair of large oxen,	160	18 head swine,	108
2 heifers,	50	Turkeys, &c.	44

Produce Raised and Sold.

Corn on 3 acres, average quantity, 58 bush. to the acre.	\$150
" 5 " injured by the August gale,	60
Barley and oats, 4 acres,	33
Potatoes, 3 acres, 450 bushels marketable,	150
" 50 " for feeding cattle,	12
Beets and carrots, valued at	25
Fruit, (not sold.)	
1800 lbs. pork, sold from 7 to 8 cents per lb.	130
Pigs raised,	22
" sold,	8
Lambs, 18 sold at \$3 each,	54
Calves, 14, " \$5 50 each,	77
Profits in carting wood cut on the farm,	48
7 tons of hay sold, \$18 per ton,	126
5 " unsold,	70
1455 lbs. butter sold, at from 26 to 33 1-3 cts. per pound,	380
Butter and milk used in family,	30
Premium received on butter exhibited at the Rhode Island cattle show,	15
Received for improvements on the farm,	48
Received for boarding laborers,	32
	\$1470

Expense.

Two hands, each 7 months, at \$12 1-2 per month,	\$175
1 boy, 7 months,	35
Paid for labor in getting hay,	26
1 hand in winter 5 months, at \$8,	40
1 boy, do.	10
Board of laborers reckoned at \$1 per week,	130
Grain, potatoes, and hay seed, used in the spring,	60
Salt for manure,	10
Salt for dairy,	6
Taxes,	28
Blacksmith's bill,	24
Balance, from which deduct rent of farm and family expenses,	926
	\$1470

The farm was not fully stocked, being unwilling in the spring to pay the high prices demanded for neat cattle. I. A. GARDINER, Tenant.

In reply to your inquiry, what experiments in agriculture have you made? we reply, that on this farm we have made many: some successful and some otherwise. We will give you as brief a detail as possible of some of them. We irrigate about twenty-five acres of upland, mostly the sloping sides of hills. The water used is from springs that rise on the farm, on the highest land. We formed a reservoir by the erection of a dam, and are therefore enabled to retain nearly all the water that collects in the day and run it on to the meadows in the night, preventing the grass from being scorched or wilted as it would be if put on in the heat of the day. We carry a portion of this water to our barn yards, to our hog pens, and also to our dairy house, where we have put in a water wheel for the purpose solely of aiding the dairy maid in the process of making butter, and find a very considerable labor saved. We intended to have used the water power in churning the milk daily, instead of the cream, in the manner practised by some of the western farmers. We tried the experiment, and found no difficulty in the process, and the butter was excellent, but the quantity fell short so materially that we abandoned it.

We tried the experiment recommended by some Pennsylvania farmers, that of setting the milk partly under ground, and letting the water constantly run round the pans of milk by setting them into excavated shelves. We found that the milk would keep sweet longer and the cream was equally as good, if not better. But here again we found a diminution: so much cream would not rise on the milk. We therefore continue the old mode.

This experiment convinces us, that a milk room should stand separate and apart from any other building, be of good size and height, well ventilated, and shaded with forest trees, and be used solely for that purpose.

We have tried the experiment of flooding land. We built a dam on a small river that runs through the farm, on the sides of which are what is termed interval or river meadows, (about thirty acres,) and by flowing back we cover the whole extent, and keep them flowed from November to April, when we draw it off and find slime and mud deposited on the surface that enriches it, and our crops of grass have increased thereby both in quantity and quality. We cart sea weed a distance of from four to six miles, and we think we find our account in it when properly used. It should be spread in hog pens or yards, small in extent, and coarse sand, (the best is found on the shores,) mixed with or spread over it, which will be by this preparation converted into fine compost by the swine being yarded upon it. We derive another advantage in putting the sea and rock week into our hog yards; they will feed considerably on it, and it serves to make them healthy and prepares them for fattening.

We use considerable impure salt in our composting. We purchase the sweepings of the vessels' holds, in which it is imported, and consider it a cheap, valuable material for the purpose.

Some of our neighboring farmers, cart salt water from the sea shore, a distance of several miles, and think it better than to let their teams be idle. This

they spread on beds of loam, and it is thereby very soon converted into a black mould.

We salt our river meadow hay, putting from two to three pecks of fine Liverpool salt to the ton, and we think we are thrice paid for so doing; firstly, in the time saved in curing the hay; secondly, in its increased value; and thirdly, in the salting of the cattle which are fed on it. Besides we find that low meadow hay, when salted, will not deteriorate if kept several years, and we believe it improves by being kept two years.

We had dug some peat for fuel, and used it to some advantage; but until we heard the suggestions you made of the possibility that our worn out soils might by the aid of peat be restored, we had not tried it to any extent as a manure. We have since opened a bed on the farm and dug out about 100 loads, at an expense of about 15 cents per load, with which we mixed ten tons of animal manure and six casks of Harris rock lime, which cost in Providence, \$1.25 per cask. The frost pulverized it, and we found it this spring in a good state for spreading on our meadows, and to use on our corn and potato fields. On the meadows we have already ample evidence of its utility.

We have experimented with menhaden fish. For the first and second year they appeared to be a benefit, but afterwards we found the land less productive than it was before the fish was put on, and indeed in some places almost barren.

We are of opinion that fish operates on the land like the free use of ardent spirits on the system of the laborer, who, while the excitement is on, is enabled to do more work; but when it is gone is left in a torpid and enfeebled state.

REPORT OF THE ROTCH FARM, N. PROVIDENCE, [R. I.] LEASED AND CULTIVATED BY MR. ADAM ANTHONY.

From the same.

I have great satisfaction, says Dr. Jackson, in laying before the citizens of Rhode Island, the very lucid and detailed report of Mr. Adam Anthony, who is one of the most intelligent and successful farmers in the state. Mr. Anthony cultivates a farm leased of Mr. William Rotch, of New Bedford. The farm is situated two miles north of the city of Providence, and the soil is naturally poor, light and sandy, with some patches of thin swamp, having a light covering of black peat. A large portion of this farm was originally almost barren, or supported only a thin forest of pine trees. By chemical analysis of the natural soil, it was found to be an ancient granite diluvium, charged with decomposed vegetable matters, in an acid state. Hence the theory of his improvements by means of ashes, containing alkaline matter and lime.

Memoranda furnished by Mr. Anthony.

Farm consists of
Ploughed land 30 acres, valued at \$141 per acre.
Pasture 26 ' ' 70 '
Mowing 18 ' ' 150 '
Wood 30 ' ' 40 '

Crops.

Corn, 268 bushels—64 1-2 bu. per acre: soil, sand and sandy loam: manure, 7 cords per acre.

Potatoes, 592 bushels—236 bu. per acre : soil, sand and sandy loam : manure, 7 cords per acre.

Turnips, 1300 bushels—650 bu. per acre : soil, sand and sandy loam : 240 bushels of ashes ; manure, 3 1-2 cords per acre.

Barley, 10 tons—1 3-4 tons per acre ; cut for fodder : soil, sand and sandy loam.

Hay, 50 tons—2 3-4 tons per acre ; 5 acres upland, 3 lowland ; sandy ; 10 of reclaimed peat bog ; 2 acres of upland, top dressed with 5 cords manure per acre.

Millet, 40 tons—2 3-4 tons per acre ; soil, sandy ; 4 1-2 acres no manure—10 ashed, 100 bushels to acre.

Pumpkins, 5 tons from among corn.

Other produce.—Beef, 9500 lbs. ; pork, 567 lbs. ; milk, 8764 gallons.

Cost of cultivation per acre.		Value of crop.
Indian corn,	\$49	\$87 25
Barley,	27	31 00
Potatoes,	46	78 00
Turnips,	47	116 00
Hay,	24	49 00
Millet,	24	49 00
Stock.		Value.
1 horse,		\$50
2 oxen,		70
18 cows,		648

North Providence, 12 mo. 2, 1839.

DR. C. T. JACKSON—*Esteemed Friend*—Having filled such of the blanks in the form appended to the circular as were necessary to the requisite statements respecting my crops of this year, I avail myself of the convenience of a separate sheet to notice such of the questions as I am able to answer.

I have made no experiments that have been sufficiently carried out to be of other importance than as affording suggestions for further trial and more accurate and extended observation. Of this character are those with nitre, potash, &c., of which a statement has already been given. It may be well, however, to repeat it here. Several plats of ground, each containing a rod, half a rod apart, on a field of sandy soil which had been recently sown with millet, without manure, were treated in the following manner: one with lime, one with ground oyster shells, and another with salt—four quarts to each: one with a peck of recent, another with the same quantity of spent ashes: the next with potash and the last with saltpetre—each a pound. The lime and oyster shells produced no effects, the millet being no better than on the undressed ground about them. Salt had been furnished in too large a quantity, and destroyed most of the seed. The few plants that came, however, grew very luxuriantly. There was no perceivable difference in the ashed portions, the crop being alike better than on the intermediate spaces. Potash and nitre gave the best results, the latter the most striking. The ground was in fine condition. It produced at least three and a half tons of millet to the acre.

I have tried lime in but a few instances, and not at all in composts. In a potato drill, on a sandy loam, it was evidently injurious to the crop ; and as a top dressing for grass grounds, one a sandy soil, the other a reclaimed bog abounding in vegetable matter, it was of no perceivable benefit.

Spent wood ashes have been the principal ma-

nure which I have used in amending the condition of light loams and sandy and gravelly soils. On all these they are used to great advantage ; and to a profitable result in the improvement of the two last mentioned, combined with the growing of clover they are almost indispensable, especially if the soil be of very sterile character.

Besides the experiment above noticed with ground oyster shells, I have applied them to sandy and to loamy soil for grass and for turnips, but without effect.

Bog mud of peaty character has been used to some extent in my manure trenches, and is deemed excellent for the purpose—more valuable than loam.

On the sandy and poorer grounds of the farm millet and clover are the most profitable crops. On those of firmer texture the root culture has given the best results. A part of the difference in the superior profit, however, is but apparent. Requiring most or all of the season to perfect their growth they prevent, without some intervenient crop, late summer or early fall seeding, the seasons, I believe, in which lands in high condition are most profitably laid down to grass. The value of the produce of the farm this year, inclusive of pasture, feed and the products of garden grounds (included in the ploughed land, but not otherwise noticed,) is \$2340. And it appears on examination of my accounts, that its conversion into the forms in which most of it is disposed of, is not likely to give a very dissimilar result. Sales have been made to the amount of \$2962 84, and there is on hand \$669, worth more than at the commencement of the year. To this should be added \$600 for the manure made by the stock ; making in the aggregate \$4231 84. From this sum should be deducted the cost of the grain purchased, and the hogs and cattle fatted, which amounts to \$1214 65, leaving a balance of \$3017 19 as the value of the produce. The excess over the first estimate of \$177 19, will probably defray all extra expense incurred by the disposition which is made of it.

The liquid manure from the stock is saved, but has never been separately applied. Both this and the solid matter are received into a trench in the rear of the cattle stalls, and with the admixture of bog mud or loam, make a compost much more valuable than ordinary stable manure. Six dollars a cord for it may be thought to put an end to all profitable results in farming, but the effects of its application sustain me in this opinion of its value. It is charged at five dollars, in my estimates of the cost of crops, one sixth part, I consider, as being appropriated by the soil to its own improvement.

I have limited my estimates in regard to crops, to such only as have been raised on the farm this year. There are others, in the culture of which I have had some experience ; such as oats, beets and carrots. Oats, in general, give about the same results as barley. Beets and carrots cost more in the cultivation than ruta baga ; beets perhaps \$6, and carrots \$12 an acre. The product, with me, has been about the same, and they are probably of equal value. The difference, if there be any, as food for stock, has escaped my observation. In regard to beets, however, I speak only in reference to the scarcity and yellow French. The white and red are said to be of better quality.

In the valuation of the lands of the farm, buildings have not been included. These, exclusive of

the dwelling house, would add about twenty per cent. to their value, and of course, about one and a half per cent. to the cost of crops as interest.

Respectfully, and very truly thy friend,
ADAM ANTHONY.

CANALS AND RAILROADS OF VA.

From Tanner's Railroads and Canals of the U. S.

CANALS.

James River and Kanawha Canal and Railroad.—This work is nearly completed, by canal, with some slack-water navigation, between Richmond and Lynchburg, and is under contract between Lynchburg and the mouth of North river, Rock-bridge county, Virginia. Beyond this point it is yet doubtful what direction it may take. One of the plans being to continue the canal to Covington, and thence construct railroad across the Allegany mountains to the Greenbrier, and thence along that stream and the Kanawha, and by way of the valley of the Mud river and the Guyandotte, to the Ohio, at the mouth of the latter stream. The other to continue the canal only to Buchanan, taking the railroad thence along the valley of Virginia to the New river, and thence down this river and the Kanawha to the point of divergence to the valley of the Mud river and the Guyandotte, as above. The latter route seems to be preferable, not only by its greater natural facilities, but because the position of the railroad between Buchanan and the New river would, whilst constituting a part of the great western communication of the state, be at the same time so much done of its south western railroad, a work promising perhaps to the commonwealth even greater advantages than its connexion with the Kanawha and Ohio, inasmuch as it would reach a trade not competed for by the lines of improvement through Pennsylvania and Maryland, and which might, therefore, be secured entirely to Virginia. Whatever direction the James and Kanawha line of improvement may take, it is to be hoped, for the welfare of the state, that its great south-western railroad will not be long delayed. As soon as it shall be completed, it may be expected to pour into the canal an immense trade, and to convey on it a very great travel; and until it is effected, the state can scarcely be expected to derive from her investment in the canal, an amount of revenue to justify her expenditure in its construction.

The whole length of the James and Kanawha canal and railroad, when completed to the Ohio, will be about 425 miles, that of the proposed South-western railroad from Buchanan to the Tennessee line, about 160 miles.

Dismal Swamp Canal—extends from Deep creek, a tributary of Chesapeake Bay, to Joice's creek, a branch of Pasquotank river, of Albemarle Sound; length 23 miles; 46 feet wide, 6½ deep; at intervals of a quarter of a mile, the canal is widened to 60, for turn-out stations; 6 locks, 100 by 20 feet; summit level 16½ feet above the Atlantic at mid tide. Two lateral canals, one from Lake Drummond, 5 miles in length, which, in addition to its uses for the purposes of navigation serves as a feeder to the main trunk; and the other 6 miles long, opens a communication between the princi-

pal canal, and the head waters of North-West river.

The navigation of the Roanoke, Rivanna and Slate rivers, has been partially improved by means of dams and locks. Companies have been incorporated for the purpose of improving the navigation of the Shenandoah, Catawba, Nottoway, Upper Bannister, Tuckahoe and South Anna, Coal, Smith's, Cowpasture, Goose, North Anna and Pamunkey rivers.

RAILROADS.

The principal works of this description in the state are the Richmond and Fredericksburg, Richmond and Petersburg, and Petersburg and Roanoke railroads, immediately on the line of northern and southern travel through the state, and constituting portions of the great northern and southern line of communication so rapidly progressing to completion between New York and New Orleans. When Virginia shall have completed the railroad between Fredericksburg and the Potomac, and connected the roads at Richmond and Petersburg, she will have done every thing that can reasonably be expected for her in facilitating the traveller on this important line of thoroughfare. A railroad between Washington and the termination of the Richmond and Fredericksburg railroad on the Potomac would still be required to prevent the interruption which now exists, when the Potomac is frozen; but such a work seems to be rather an object of national than of state concern, or at all events one in which the national government, so deeply interested in its execution, may reasonably be expected to co-operate with Virginia towards its construction. The following details in relation to the works above named, will probably be of interest.

Richmond, Fredericksburg and Potomac Railroad. This work lies in Henrico, Caroline and Spottsylvania counties, between Richmond and Fredericksburg. It is 61 miles long, and when extended to the Potomac, at the mouth of Aquia creek, (at which point it is proposed to terminate it,) will be 75 miles long. It has on it several fine bridges at the crossings of the North and South Anna rivers, Little river, and Chickahominy, and will pass the Rappahannock at Fredericksburg by a bridge forty feet high and 600 feet long, and Potomac creek by a bridge three hundred feet in length and seventy feet high. The grades and curves of the road are in general favorable; the sharpest of the latter being about 2000 feet radius, and the maximum graduation, with a single exception near Fredericksburg, (where a grade of forty-five feet was necessary,) being about thirty feet per mile. The execution of the work is, with the exception of the superstructure, highly substantial. The superstructure is of the ordinary wooden rail, plated with iron, in general use in the south, and recommended on this and most other southern roads by the cheapness of timber and motives of economy. When the travel on this road, which is increasing very rapidly, shall have become larger, the company will probably find it to their advantage to lay down heavy iron rails the whole length of their road. With this addition it would be one of the best, as it promises to be one of the most productive, in the country.

The whole cost of the Richmond and Fre-

dericksburg railroad, including a branch four miles long to the Deep Run coal mines, and including also a full supply of locomotives, cars, &c., has been, between Richmond and Fredericksburg, 1,100,000 dollars. An additional expenditure of 270,000 dollars is estimated as requisite to complete the railroad to the Potomac.

Richmond and Petersburg Railroad. This railroad, 23 miles long, connects the towns of Richmond and Petersburg. Its curves and grades are both highly favorable; a large portion of the line being straight, and the maximum graduation being thirty feet per mile. The railroad bridge across the James river, at Richmond, on this road, is one of the most striking works in America; being about 3,000 feet long, between 60 and 70 feet above the river, and having spans of 150 feet and upwards. The cost of this viaduct was but 125,000 dollars; and the whole cost of the railroad, including depots, locomotive engines, cars, &c., about 750,000 dollars.

A branch of ten miles in length has been proposed from this railroad to Bermuda Hundred, which is said to be of extremely easy execution, and which would probably add so much to the profits of the railroad, and to the commercial facilities of Richmond, that it is a matter of surprise it has not yet been executed. By means of it, produce would be delivered on board European vessels in two hours after leaving the warehouse, instead of being, as at present, delayed a day or two on a circuitous navigation in lighters; and merchants would be able to communicate quickly and constantly with their ships. This slight improvement, and the removal of the Harrison bar, would do much to make Richmond an important seaport.

Petersburg and Roanoke Railroad.—This work, 59 miles long, extends from Petersburg through the counties of Dinwiddie, Sussex and Greensville, to the Roanoke river, opposite Weldon. Near its termination it connects with the Wilmington and Raleigh railroad in North Carolina; and it is connected by means of the Greenville railroad with the Raleigh and Gaston railroad at Gaston. This railroad has on it no curve, after leaving Petersburg, of less radius than half a mile; and no grade, except at that point, exceeding 30 feet per mile. Like the Richmond and Fredericksburg, and Richmond and Petersburg railroad, its roadway, formation, bridges, &c., are executed in a highly substantial and permanent manner; but it has only a plate rail superstructure, which, with the increasing business of the road, it will probably be advisable to substitute by a substantial and heavy iron rail. The whole cost of this railroad, including depots, locomotive engines, cars, &c., has been only 800,000 dollars. By this railroad a large portion of the produce of the Roanoke valley is conveyed to Petersburg.

Besides the above railroads on the great northern and southern line of travel through Virginia, there are the following:

The Greenville Railroad.—This railroad, as above observed, connects the Petersburg and Roanoke with the Raleigh and Gaston railroad. It leaves the former railroad a few miles south of Hicksford, in Greensville county, Va., and terminates at Gaston in North Carolina, where the Raleigh and Gaston railroad commences. It is 18 miles long, and cost about 250,000. Its construction is similar to that of the Petersburg and Roanoke railroad.

City Point Railroad.—This railroad extends from Petersburg along or near the Appomattox to City Point, below the junction of that stream with the James river. It is twelve miles long, and has cost about 200,000 dollars. By means of it an important facility is afforded to the shipping interests of Petersburg, which have hitherto been dependent on lighters on the Appomattox.

Chesterfield Railroad.—This railroad connects the bituminous coal basin of Chesterfield county with the tide water of James river at Manchester, opposite Richmond. Length 13.50 miles, with branches from the main line to the principal coal pits. The line descends into the valley of Falling creek by a self acting plane, and is conducted over that of Sally's Run by an embankment 800 feet long and 40 feet high. Cost but 8,000 dollars per mile. Radius of the curves 1,442 feet. Single track, with the usual turn-outs, &c.; commenced January, 1830, completed July, 1831.

Louisa Railroad.—This railroad leaves the Richmond and Fredericksburg railroad about 24 miles from Richmond and 37 from Fredericksburg, and extends thence westward to Gordonsville in Orange county, passing by Louisa courthouse and Newark. Whole distance from the point of junction with the Richmond and Fredericksburg railroad to Gordonsville, 49 miles. Cost about \$400,000.

The Louisa railroad furnishes an outlet to the productions of a fertile tract of country in Virginia at the foot of the Southwest mountain, and forms the most convenient and agreeable route to travellers to the Virginia springs, and the western part of Virginia. It is proposed to extend a branch of the road from Newark about 12 miles east of Gordonsville to Charlottesville, and an extension of the road to Harrisburg, in Rockingham county, is spoken of.

Portsmouth and Roanoke Railroad.—This railroad commences at Portsmouth, opposite Norfolk, and proceeds in a W. S. W. direction through Norfolk, Northampton and Southampton counties, crosses the North Carolina boundary near Meherrin river, and joins the Roanoke near Weldon. Length 80 miles. Cost about 1,000,000 dollars.

Winchester and Potomac railroad extends southwest from Harper's Ferry on the Potomac, in Jefferson county, Va., where it connects with the Baltimore and Ohio railroad, to Winchester in Frederick county. Length 32 miles. Cost 500,000 dollars. From Winchester a macadamized road is now under construction to Staunton; but it is probable that this will ere long be superseded by a railroad, which would be so well justified along the fertile valley of Virginia, remarkable for both its mineral and agricultural wealth. A company for the construction of this railroad was incorporated by the legislature of Virginia a few years since, and a survey made, and very favorable location procured for the work; but the capital stock was not made up within the time limited in the charter for the organization of the company.

The above comprises all the railroads yet executed in Virginia. Other highly important works of this description have been projected in that state, which will probably be undertaken as soon as the present monetary difficulties pass off. One of the most essential seems to be a railroad between

Richmond and Lynchburg, along the ridge dividing the waters of the James and Appomattox rivers, to be extended to connect with the proposed southwestern railroad. Such a railroad would secure to the state a large travel and return trade to the southwest, in light and valuable packages, which, without it, will probably not pass through the state. A second railroad, which would add largely to the wealth of the country through which it would pass, and to the commerce of Richmond, has been surveyed, diverging from the former in the neighborhood of Farmville, and passing in a southwesterly direction to the valleys of the Staunton and Dan rivers, a short distance above the junction of those streams. With her great western and southwestern improvements carried out, and these two lines of railroad, Virginia might again take rank among the foremost state of the confederacy.

Aggregate length of canals in Virginia, 196.25 miles
do. do. railroads do. 361 50 do.

RETARDING THE HATCHING OF EGGS, CAUSES OF SICKNESS AND DEATH OF WORMS, DURING THE SUMMER OF 1840, &c.

From the Journal of the American Silk Society.

This is a most important subject, and the writer of this article feels the responsibility of the task he has undertaken most sensibly. Scarcely less than the success or failure of the great enterprise of introducing the culture of silk in the United States, depends upon it. In all parts of the country the early broods of silk worms, that were known to have been produced from good eggs, were successfully carried through their various stages, and produced good crops of cocoons. It is believed that all the exceptions to such a result were fairly attributable to defective eggs, or to attempts at premature hatching. As remarked by our correspondent, 'P.' in the present number, this success was attained even in cases 'where almost every rule of good management had been disregarded.' But in a great majority of cases the later broods have utterly failed. These failures have not been confined to the tide water regions of the south, to the middle states, nor to the west, but in all parts, at the north, south, east and west, the people have been equally unsuccessful with the later broods of worms. The symptoms and character of one variety of the diseases by which they were carried off are well described by 'P.' Others say their's were carried off by the yellows, and others by all sorts of diseases mixed—some worms dying of the yellows, some by the tripes, &c. &c. All who have had late broods, however, will have seen enough of the diseases without wishing further information on that score. A knowledge of the cause of the diseases is what is now wanting, and it is the object of this paper to point them out; whether this task shall have been successfully performed or not, remains to be seen.

One cause of the diseases of the late broods, undoubtedly was the improper mode adopted for retarding the hatching. The eggs were kept exposed to various temperatures till the germ had commenced forming, and even until some few were hatched, and then put into ice-houses, to retard their hatching. This unquestionably either

killed all the eggs thus treated, or so chilled the germs as to weaken the constitutions of the worms, and thus make them subject to the various diseases at some period of their lives. The writer of this paper was personally acquainted with several instances of failure from this cause.

Another cause was clearly traceable to the sudden exposure of eggs, properly kept previously in ice, to the extreme warm weather of midsummer. This destroys many eggs.

Another was the placing of good eggs in ice after they had been exposed several days on their passage from one place to another, during warm weather.

It would appear that the exercise of a little common sense would effectually prevent injury from any of the above causes. The directions for keeping eggs are plainly descriptive of the simple process. They must be kept during the warm weather of the season they are laid, in a cool, dry place, a cellar, if possible; if intended to be retarded, they must be placed in the ice-house or cellar, at least in the forepart of winter, and not left exposed till the warm weather of the latter part of winter and spring shall have started the germ. If the eggs shall have been kept in ice, they should be exposed gradually to the natural temperature of the atmosphere. After eggs have been kept in ice, and then exposed to a warm atmosphere for any length of time, say more than a few hours, they must not be put in ice again.

But the great cause of most of our disasters, it is believed, has never been suspected—at least the writer of this paper is not aware of its having been noticed by any writer. Neither can he prove to demonstration that it is the great cause, or any cause at all, of disease in silk worms; but he expects to be able to satisfy all inquiring minds at least of its great probability. The silk worm, when left to itself, exposed to the ordinary atmosphere, hatches in the spring of the year exactly at the time the mulberry leaves open. It is therefore an annual insect, and requires exactly twelve months to pass through the various stages of its existence. If for example a silk worm was hatched on the first day of May, 1840, the eggs that it would produce would naturally hatch on the first day of May, 1841. That it is by no means unreasonable to suppose the existence of such precision of periodical development in silk worms, we may be satisfied by reference to the habits of various other insects and animals. The American locust requires exactly seventeen years to perform its circle of existence, as has been clearly proved. The swallow martin makes its appearance in its usual haunts nearly, if not exactly, on the same day of every year. But we will not consume time in reasoning on the subject—believing the reasonableness of the assumption to be sufficiently apparent. If we admit this position, we shall then have arrived at the point desired, which is that we cannot retard or delay the hatching of the worms, for any considerable length of time beyond their natural period, without doing violence more or less to the constitution of the insect; and the longer we do retard the hatching beyond this period, the more injury we do the worm, until we accomplish its death in the egg. Here we shall be met with the case of the Messrs. Carson, who retarded the hatching of a box of eggs from 1837 to 1839; and by various other instances of re-

tarding eggs for short periods; all which have been duly considered and will be noticed in their proper place—suffice it to say here, none of those cases have been found to be insuperable objections to the position above assumed.

The great cause of disease and death in the late broods of silk worms, then, we consider to have been the attempt by means of very low temperatures, to protract the hatching of the eggs too long. For example, eggs that would in the natural temperature of the atmosphere have hatched on the first day of May, were protracted in their hatching till the first of July, and consequently the germs in the eggs were either killed or so weakened, that disease and death followed sooner or later after they hatched. That the extreme low temperature of the ice-house did any injury independent of that inflicted by the protraction of hatching, we do not believe. We have had sufficient proof of the contrary. It appears to us that the simple prolongation of the time that the insect remained in the egg, caused all the injury. We know that very little if any injury will be done by retarding the hatching one month, and we know that exposure to warmth will accelerate the hatching about the same time. We also know that a good cool, dry cellar, will retard the hatching of the eggs one month, and therefore, if our views be correct, no ice-house will be necessary to the keeping of eggs in any part of the country. The remedy, therefore, for the great evil complained of, is apparent, and we now proceed to it.

Assuming the above position to be correct, if we wish to hatch out a brood of worms on the first day of each month, say first of May, June, July and August, all we have to do is to use eggs produced last year from worms that were hatched at those periods respectively. To accomplish this, we must mark each lot of eggs with the date at which the worms that produced them were hatched, and when we bring them out for hatching, take those whose date corresponds with the time we bring them out to hatch. For example, on the 1st of July, 1841, we bring out a lot of eggs to hatch; we therefore take those marked 1st of July, 1840, and so on with the various parcels. To enable us to accomplish this, that is, to get possession of eggs of these various periods, it will only be necessary to protract the natural hatchings about one month each year. Say we have only one parcel of eggs, and they were produced from worms hatched at the natural period in the spring. We will hatch half of them at the natural period, and protract the other half by keeping them in the cellar one month, bringing them out to hatch on the 1st of June. We mark the eggs produced by both these parcels of worms, the one '1st of May,' the other '1st of June.' Next year, we take the eggs marked 1st of June, hatch half of them according to their date, and protract the other half to 1st of July. The year after we take those marked 1st of July, hatch half of them, and protract the other half till the first of August. This system will supply us with eggs for hatching during the whole season, without injury to the eggs or the worms. If it be desired to have hatchings every two weeks, either of the two parcels with dates nearest the intermediate periods, will be proper for use.

We shall now proceed to state some facts in illustration of the above theory, and which have

suggested to us these views. A gentleman in Delaware, last year produced one of the finest parcels of eggs we ever saw. He placed them in the ice-house in the winter, where they remained till the last of May, when he sent them to us. He packed them in a box of ice, while in the ice-house, in which box they came to us and were put in our refrigerator, without any exposure to the warm atmosphere. These eggs we sent to different parts of the union in small parcels, from the 1st of June to the 23d of July. The first parcels we sent away, hatched in from ten to thirteen days from the time they left us. But the time after leaving our refrigerator until they hatched, became gradually shorter until the 23d of July, when they hatched in 24 to 30 hours. We heard of nearly all the parcels we sent away, and nearly all did unusually well; the exceptions were the two or three last parcels sent off, and one of the last parcels was a failure, the worms were weakly, became sickly, and as they approached spinning, sickened and died of various diseases. Every rule of good management was observed, and various remedies resorted to without avail. One lot of the same eggs was sent to a gentleman in Virginia, on the 20th of June. By some accident the letter was delayed on its passage in the mail *twenty-one days*, so that he did not receive the eggs till the 11th of July. They were all hatched, of course, and many of them dead. How long they had been hatched, can of course only be conjectured. Other parcels we know hatched in ten days after leaving us; but we cannot conceive of the ability of the young worms to sustain life eleven days without food. However, the gentleman immediately spread them out on his tables, and gave them leaves, which all that were alive commenced eating greedily. The result was, he gathered 3000 of the finest cocoons he ever saw. During the whole period of their feeding, he did not lose a dozen—having had no diseases among them. We ought to have stated that we sent him half an ounce of eggs. This fact proves of itself the good quality of the eggs at the time we sent them; if it did not, we could adduce abundance of other testimony; that is, they were good on the 20th of June. The other fact stated above, proves that they were *not good* on the 23d of July. If the mere retarding their hatching was not the cause of their bad quality in July, what was? The worms that produced these eggs were hatched, or commenced hatching, on the 20th of May, last year. These facts, we think, go far to establish the correctness of our views as above given, that the eggs of worms that were hatched on the 20th of May, 1839, would naturally have hatched on the 20th of May, 1840, but were capable of being retarded in hatching till the 20th of June, without injury; that when retarded to a later period, they suffered more or less in proportion to the length of time they were so retarded.

We have several other facts that correspond precisely with the above in all parts, both as to attending circumstances and results, but we deem it useless to waste time and room in stating them, as they could only prove that we have not made up our opinion upon the evidence of a single isolated fact, and this we hope it is not necessary to prove.

If the above theory be correct, it is easy to account for most of the failures that have occurred in

our country during this summer. Eggs that ought to have been hatched in May, were protracted perhaps till July, and eggs that ought to have been hatched in July were attempted to be hatched in May, and both were killed or badly injured; for it must be borne in mind that *protraction* of the hatching of eggs is not alone the cause of failure. Many persons have failed from an opposite course. Eggs that were produced by worms hatched in August, were attempted to be hatched in May and June. They were exposed in the ordinary way, a few scattering worms came out, as is always the case even the first season, and no more hatched. The temperature was raised, but no effect was produced, other than perhaps destroying the eggs, and they were finally given up as bad eggs that would not hatch at all. The fact was, the eggs had not passed the time required for their maturity, and therefore, would not of course hatch until late in July or August. We hope to be able to illustrate this part of our new theory before this paper goes to press, with the statement of a most interesting fact in point.

The instance of retarding eggs from 1837 to 1839, by the Messrs. Carson, of Lancaster, Pa., and on which nearly the whole practice of protracting by means of ice-houses has been founded, is certainly the most powerful argument that can be brought against our present position. We do not, however, consider one instance of success as conclusive, against so many as have been adduced this season of an opposite character. It cannot now be known at what time in the summer of 1837 the worms were hatched that produced the box of eggs in question. In answer to our inquiry on that point the Messrs. Carson say, 'they were hatched about the middle of the season, we cannot speak positively, as to the time. Brother Thomas, since deceased, attended to the silk business entirely at that time.' The eggs may have been produced late in the season of 1837, and having been placed in the ice-house and remaining there steadily they would not of course hatch till very late in the season of 1838, or until the common temperature of the atmosphere was too low to hatch them, and thus they passed over the entire year of 1838, and hatched in 1839. We have entire confidence in any statement made by the Messrs. Carson; but may we not be permitted to suggest the possibility of a mistake having been made in supposing the box of eggs found in the ice-house to contain eggs of the produce of 1837, when in fact they were the product of 1838? In their letter giving an account of the affair they say the eggs 'were deposited in the ice-house in the fall of 1837 with the intention of feeding them in the summer of 1838, but were overlooked, and our attention was not drawn to them until it became necessary to fill the ice-house again when the box was found with about 30,000 mammoth white silk worm eggs.' Now as these eggs had escaped their recollection from the fall of 1837 to the winter of 1838, may it not have been possible that they were in fact the produce of 1838? At all events, except that of the Messrs. Carson, every attempt that we have heard of, and they amount to hundreds, to keep eggs from hatching later than a month or so after the natural time of hatching, has proved a failure.

The Rev. Mr. McLean in his statement in the November number of 1839, does not state at what

time in 1838 he produced his eggs. If he produced them from worms hatched as late as the middle of July, 1838, then his statement will be corroborative of our theory; if the worms were hatched earlier than July, it is evidence against it. It will be recollected that his worms in 1839 were hatched on the 31st July, August 19th, and August 27th, his eggs of the previous year having been kept in ice till the time of hatching.

The above are our views on this momentous subject. It will be seen that they are in direct conflict with views even recently entertained by us. They are, however, perfectly coincident with our opinion formerly and for the first ten years of our experience, when we most carefully examined into the whole affair. It is in the recollection of all our friends, that until the accidental experiment of the Messrs. Carson, and that of Mr. McLean, we had no confidence in our ability to produce successive broods of silk worms during the entire season, and that we were induced by those experiments and some others to change our opinion. (We always objected to 'two-crop worms,' and it must be remembered that they have not been taken into view at all in any of these remarks.) We now believe we were right in our old opinion, so far at least as is stated in the preceding pages.

It is to be understood that the failures treated of in the above paper, are those only in which the worms had been properly treated, and in which the original stock of eggs was unquestionably good. It is not to be inferred that success in retarding the eggs will of itself ensure success in the result of the crop. The worms must have, besides perfection in the eggs at the time of hatching, all proper management, such as proper food, plenty of shelf room, cleanliness, and above all, free and pure air.

In conclusion—we shall watch this most interesting subject closely; shall collect all the information possible; and shall lay the result before our readers, in the course of the present year.

We must be permitted to make one more suggestion, which seems to be called for by the above theory, and that is, that all persons in purchasing eggs should be informed precisely of the time when the worms were hatched that produced them. It will readily be perceived that, if our views as above expressed be correct, this information is absolutely necessary. For example: we want eggs next year to hatch in July, we shall of course purchase those produced this year from worms hatched in July. All who produce their own eggs can of course mark them for themselves; and those who sell them should also do so. The well known necessity of good health in the original stock will of course not be overlooked. G. B. S.

CLEANING CLOVER SEED.

From the New Genesee Farmer.

Messrs. Editors.—In your paper for this month, I read an inquiry from a Canadian correspondent, (S.) as to the method of cleaning clover seed.—Now, to pen an accurate description of a clover machine would require too much room, as well as a much abler pen than mine. Nevertheless, I will use my best efforts for the benefit of your readers, it being a request from you to your correspondents generally.

The first process is separating the heads from the straw.—This is done by thrashing it with a flail, in the usual manner of thrashing grain, which can be done with comparative little labor, in cold winter weather.

The second process is separating the seed from the hull or chaff.—The machine necessary for this purpose is similar to a small sized thrashing machine, except that the cylinder and concave are covered with heavy sheet iron, which is punched with a round and sharp punch, so as not to cut the piece out where it goes through; but leave the edges sharp and ragged on the under side. This is nailed on to the cylinder with the rough side outwards, and the concave, similarly punched, is nailed on with the rough side inwards. These are set so close together, that a few of the longest teeth (as they are called) will touch until it has been used for a while.

The heads or chaff, as it is often called, are fed into the machine through a hopper, which extends the whole length of the cylinder, and is secured over the cylinder, so that not more than one-third of the width or diameter of the cylinder is visible through the mouth of the hopper, which is formed with the ends perpendicular, and the sides spreading not more than half as much as the hopper of a common fanning mill.

The manner of driving this machine, as well as the size of it, must depend on the power by which it is to be driven.

The third process is cleaning the seed when so separated.—Any ordinary fanning mill will answer this purpose. First, close the side doors which regulate the current of air; then take out all sieves but the coarse chaff and the wheat sieves; then put a thin board in the place of the sloping or chess sieve, so as to prevent the seed from going into the chess box, and also remember to put the wheat sieve into the lowest sliding place, so as to break the fall of the seed on the sloping board; then turn rather slowly and feed slowly.

It will be found on examination, that a part of the chaff, (that part lying next the mill,) has yet some seed in it; this must go through the machine again, and we have sometimes to put a portion through a third time.

When this is accomplished, the seed will be separated from the chaff, dirt, &c.; but in order to make it fit for sowing, or for market, it must be cleaned similar to timothy, turnip, or other small seeds. For this purpose it is necessary to have, instead of the wheat sieve, one finer than the sloping or chess sieve; the material for which can be procured at any of the hardware stores—and the wheat sieve must be substituted for the coarse or chaffing sieve.

I have briefly stated the method used in this neighborhood; and although but imperfectly described, it can, I think, be comprehended by any man of ordinary mechanical powers.

Yours, &c.,

W. N. H.

Yates Co. August, 1840.

IMPORTANCE OF PROTECTING BIRDS.

From the New England Farmer.

Mr. Brock—In my communication on the origin of the borer and my mode of extracting them, I

spoke of a narrow gouge as being the best instrument with which I was acquainted for this purpose. The remarks you made in relation to it, saying that "the bill and long tongue of the little speckled woodpecker were quite as effectual," have induced me to send another communication—not that I dissent, but to say that I fully concur with you. I believe from what I have seen and known by experience in farming, that if sportsmen were treated as they ought to be, encroaching as they do upon the public rights, the interest of the agriculturist would be greatly promoted: the birds no longer frightened away from our habitations, would congregate in our orchards and gardens, and rear their young in our midst, and the husbandman might fold up his hands in complacency, for aught that could injure him in the shape of a worm or insect. Nor is this all: we should not only have our trees and gardens freed from insects, but music, sweet music would be heard from every 'bush and tree;' and who is there that does not like to hear the songs of the feathered tribe? Surely if ever there was music that was intended by the Deity to cheer the drooping heart of the farmer and impart joy and happiness, it is the music of the songsters of the grove. How often as he goes out in the morning to engage in the toils of the field, is his heart made glad by the joyful notes that burst from every quarter upon his ear, and sympathizing with the charming sounds, he goes whistling or singing to the plough, rejoicing in Him who created all and pronounced his works very good. Now who would alter this wise and merciful provision of Providence? None! none! unless it is the mean, base, low-lived, loafing sportsman—a set of scamps destitute of all moral restraint, who now are, and always have been, a nuisance to all good society.

But again: having our trees secured from the vermin which infest them, and the pleasure we derive in listening to their sweet music, are not all the benefits which we derive from the protection of birds. No—other advantages are numerous, and I presume my employer will not be affronted if I mention one which will result to him in this respect. During the whole time he has been a resident of the place he now occupies, he has never in the least manner discouraged the coming of birds upon his farm and garden by shooting them himself or allowing others to do so: and not even in the time of cherries, when it is customary to put up something in the tree to frighten them away, has he done it; but always allowed them to come and get what they pleased; consequently his trees are not so much infested with insects as his neighbors', and what is worthy of notice, the birds have planted the cherry stones in the grove and about the farm so liberally, that I have no doubt but what three hundred English cherry seedlings may be found upon the place of all sizes. These trees my employer intends to have taken up soon, and put in a convenient place for sale, which if disposed of at the common price, will bring a good round sum—more money than was ever gained in preventing the birds from eating a few cherries, that the owner might sell the more, without saying any thing of the many insects which the birds would destroy in the mean time.

The increase of insects is not only a sure result of killing the birds, but how often have I seen the sportsman discharge his gun into the small branches of the tree, stripping leaves, buds and bark en-

tirely off, and oftentimes cutting off quite a number of the fruit. Cannot and shall not these things be prevented? There is a law to prevent our property from being injured, and if a man injures our trees by shooting into them, ought he not to suffer the penalties of this law? Surely he had, and that too with a double force; but who has ever yet prosecuted a man for shootings birds in his orchards? has it been done by any man? if so he deserves the praise and good wishes of every farmer. If it has not been done, if we have patiently submitted to this outrage upon our property in times past, let us resolve we will do it no longer—let us (the farmers) awake to this subject and say it shall be so no more, and exert ourselves to put a stop to such gross insult and abuse. If you order the sportsman off your premises, he is affronted and thinks he is doing no harm. What strange ideas some men have of property at the present day, to think they may do what they please upon their neighbors' grounds. Would they be pleased to have their own premises thus invaded and their property destroyed? We think not. They know they do wrong, or they would not run away at the approach of the owner. We concur with your friend in considering "the person who destroys the birds on his premises, in the same light as though he robbed his purse."

For one I hope there will be more interest taken in the preservation of birds, so that the time may soon come when they shall become our familiar friends, and feel that we are their protectors rather than enemies.

Yours, &c.

J. M. HARTWELL.

Medford, Mass., Aug. 25th, 1840.

THE NOVEL ARTIFICIAL WATER POWER, CONSTRUCTED BY THE SHAKERS OF CANTERBURY.

From the Farmer's Monthly Visitor.

Our next object of attention was the artificial water-power created by the first family at an almost incredible amount of labor and expense. The Shaker village is situated at the high point near the sources of the Soucook river running into the Merrimack from the north-east, and above the mill seats found upon the stream. Here, where no natural stream ever ran, they have created a more permanent and durable water-power than can be found within the distance of ten miles. To make this water-power effective in the dry as well as in wet seasons, no less than eight artificial ponds covering from five to thirty acres each have been created, one rising above the other, and each furnishing a stream large enough to carry different mills and factories. To feed the stream with a constant supply of water there was not at first any considerable stream or body of water. It was commenced by damming around a small meadow in which the melting of the snow in the spring caused the water to collect. Other reservoirs created in the same way succeeded to the first; until a permanent and highly valuable water-power was completed by the purchase of a considerable swamp or morass up-hill at the distance of nearly two miles, which was dammed up to retain the water in the same manner, and from which a trench

or ditch through the rough stony ground was formed for the whole distance. The dams which constitute in some instances two sides and nearly half of a reservoir have been made by a prodigious labor in collecting and arranging stones and gravel. It being found that the water would ooze through the natural ground, that has been dug up to give place to other materials, as gravelly clay and rocks, which should make the dam water-tight.

The immense work done to create this artificial water-power, being at a distance from any travelled road and from the villages of the Shakers, has probably never attracted the attention of a hundred persons who have viewed and estimated its magnitude. We know nothing of the kind effected by individual enterprise any where within the limits of the state. It is true there are works connected with the water-power of factory establishments that have cost more money; but there are none where such labor has been performed, and such expense incurred merely for the purpose of the individual domestic convenience of those performing the labor.

At the lower point upon this artificial stream is,

1. A building 35 by 50 feet and two stories, containing apparatus and machinery for carding wool.

2. A building with a machine for sawing wood. At this place, being near an extensive and beautiful woodlot, the fuel used by the family is prepared, being sawed and split of that size which is most effective in imparting heat. With stoves of their own invention and construction, with rooms fully finished, the brethren obtain double the effect from half the quantity of fuel generally consumed. In the preparation there is not a particle of wood wasted; for even the finest saw-dust is carefully preserved for use.

3. Rising to the outlet of the third pond from the foot is an extensive building eighty feet by forty and three stories high—a building framed of stouter timber than is often found in the largest structures. This building covers a grist-mill with four runs of stones, of which is one set of burrs for the manufacture of flour. This mill is visited by customers ten, fifteen and twenty miles distant, who are unable to find another so good; and it is remarkable that the Shaker stream made upon the dry land fails not for water, when others upon running natural streams give over their customers in time of drought.

Under the same roof and moved by the same wheel is a mill for sawing common boards from logs—a circular saw for slitting—a machine for sawing pail staves—a mill for grinding malt—also, a shop for manufacturing measures, as half bushels, pecks, &c.

The great wheel which moves the machinery of this building is thirty-four feet in diameter, and the space in which its under part traverses is drilled out of the solid rock some eighteen or twenty feet deep, of twice that length, and some twelve to fifteen feet in width.

The dust of the several saw-mills falls directly to a basement into which, on the opening of doors, cart and oxen are backed to carry it away for the profitable uses to which it is applied: the surface slabs of the sawed lumber are all preserved for fuel or some other economical purpose, so that no fragment on the premises of the brethren is left to be wasted.

The expense laid out in constructing the buildings and machinery of the third building, with the economical expenditure of the Shakers, exceeded ten thousand dollars, without taking into the calculation any part of the cost of the artificial water-power. Levi Stevens, who has the personal charge of this building, a man of about sixty years, is known for some ten or fifteen miles round as probably the best miller in the county of Merimack.

4. The fourth building above on the stream, erected before the mills below, is forty by thirty feet, used as a factory for various purposes. In this building, when visiting the Shakers on a week day, we have always found the venerable Francis Winkley at work. He is eighty-two years of age, and served his time as an apprentice at the smithing business at Dover, N. H., about sixty years ago. He commenced with the Shakers between fifty and sixty years since, and in that time has manufactured with his own hand twelve thousand iron candle-sticks. He has been for many years the efficient financial manager of the whole establishment, and in that management has discovered talents which might have qualified him as an efficient head of almost any government.

The machinery of this fourth building is of an age of twenty years. Here the Shakers have made the improved pails which have been so much used and admired throughout New England for their perfection and durability. The second family has likewise a pail manufactory recently erected on a small stream running through their premises, made after the fashion of more recent inventions; but the first family continue to make their pails now as they made them with the machinery of water-power twenty years ago; and they think their old labor-saving invention to be nearly if not quite as good as the new method which has been adopted in several manufacturing towns of the interior. The water-power of this building is also used for various other economical purposes; among them was a cannon ball in a mortar turned for the purpose of pulverizing barks and medical roots—a machine for polishing metals, and machines for turning and boring.

5. The fifth building upon the stream was the clothing works, where the beautiful woollen cloths and flannels manufactured by the sisters are fulled and dressed. Here were samples of all wool, mixed worsted and cotton cloths that would have done credit to the best modern manufacturing establishments. Calvin Goodale had the charge of this clothing establishment; he was educated to the business here. He made use of teasels in raising the nap upon the cloth; and he exhibited to us a specimen of that article which he had improved by the selection of the seed, the points of the pricks being turned so as to strike the surface of the cloth in the best direction, and the head being a perfect cylinder instead of a cylinder split in the middle of half the size. From repeated observation, we do not doubt that many vegetables have been and may be perfected and improved in shape, size and quality by attention in the selection of seeds, in the preparation of the soil and the care of cultivation.

6. The sixth building on the stream covered a tannery and bark-mill in the basement story, and a mill for the manufacture of shingles and a thrashing machine room. The last machine was

an invention of the shakers and had been used by them for thrashing their grain for more than twenty years. The old machinery and gearing of this mill had been just taken down, and a self-acting arm, or wheel made of tubes of cast-iron—a recent invention—had been procured to supply their place. The head and fall at this mill is fifteen feet; the water is forced into the iron tubes which revolve under the surface of the water. A small quantity of water pressing continually from above is only requisite; and where there is little head and fall the wheel works well with abundance of water. The tube-wheels are thought to be a great improvement where they have been used. The works at this mill were constructing under the immediate direction of Elijah Brown, who had derived his mechanical knowledge with the Shakers, and was both tanner and mill-wright. The mill was not only undergoing an entire change in the application of the water-power to a different wheel, but a more copious water-channel was constructing through the hard rocks.

OKRA SOUP.

From the Southern Agriculturist.

Take one peck of okra pods, which must be very tender, cut them across into very thin slices, not exceeding one-eighth of an inch in thickness, but as much thinner as possible, as the operation is accelerated by their thinness. To this quantity of okra, add about one third of a peck of tomatoes, which are first peeled and cut into pieces. This quantity can be either increased or diminished, as may suit the taste of those for whom it is intended. A coarse piece of beef (a shin is generally made use of) is placed in a digester with about 2½ gallons of water, and a very small quantity of salt. It is permitted to boil for a few moments, when the scum is taken off and the okra and tomatoes thrown in. These are all the ingredients absolutely necessary, and the soup made is remarkably fine; we, however, usually add some corn, cut off from the tender roasting ears, (the grains of three ears will be enough for the above quantity)—we sometimes add about a half-pint of Lima or Civic beans—both of these improve the soup, but not so much as to make them indispensable—so far from it, that few add them. The most material thing to be attended to is the boiling, and the excellency of the soup depends almost entirely on this being faithfully done; for if it be not enough, however well the ingredients may have been selected, the soup will be very inferior, and give little idea of the delightful flavor it possesses when properly done. I have already directed that the ingredients be placed in a digester. This is decidedly the best vessel for boiling this or any other soup in, but should there be no digester, then an earthenware pot should be preferable, but on no account make use of an iron one, as it would turn the whole soup perfectly black. The proper color being green, colored with the rich yellow of the tomatoes. The time which is usually occupied in boiling okra soup is five hours. On M. and take it off about 10 o'clock. The whole of which time it is kept boiling, the cook at the same time stirring it frequently and mashing the different ingredients. By the

time it is taken off it will be reduced to about one half; but as on the operation of the boiling being well and faithfully executed depends its goodness, (as I have already remarked,) I will state the criterion by which this is judged of. The meat separates entirely from the bone, being 'done to rags,' the whole appears as one homogeneous mass, in which none of the ingredients are seen distinct—the object of this long boiling being thus to incorporate them—its consistency should be about that of thick porridge."

PROTRACTED VITALITY OF SEEDS.

From the Hartford Courant.

Without admitting such doubtful cases as those of seeds preserved in mummies having germinated, there are many instances of seminal longevity about which there can be no doubt. Books contain an abundance of instances of plants having suddenly sprung up from the soil obtained from deep excavations, where the seeds must be supposed to have been buried for ages. Professor Henslow says that in the fens of Cambridgeshire, after the surface has been drained and the soil ploughed, large crops of black and white mustard invariably appear. Miller mentions a case of *Plantago Paylli* having sprung from the soil of an ancient ditch which was emptied at Chelsea, although the plant had never been seen in the memory of man. De Candolle says that M. Gerardia succeeded in raising kidney beans from seeds at least a hundred years old, taken out of the herbarium of Tournefort; and I have myself raised raspberry plants from seeds found in an ancient coffin, in a barrow in Dorsetshire, which seeds, from the coins and other relics met with near them, may be estimated to have been sixteen or seventeen hundred years old.

PERIOD OF GESTATION IN COWS.

From the Southern Cultivator.

One of the most satisfactory experiments relating to the subject, on record, is the one made by Earl Spencer, and the particulars of which are given in the second number of the English Agricultural Society's Journal.

The table given contains the results in the case of seven hundred and sixty-four cows, and the following statements abridged from the paper, will exhibit some of the most important of the details:

First. It appears that the period of gestation varied from 220 days to 313 days; or no less than 90 days. Lord Spencer was, however, unable to rear any calves produced under 242 days. All under 260 days, and over 300, he thinks are decidedly premature, or irregular.

Second. As 314 cows calved before the 284th day, and 310 after the 285th day, the average period of gestation must be considered as between 284 and 285 days; although the time stated in the work on Cattle by the London Society states it at 270 days.

Third. It appears, that omitting those considered as premature or irregular, the cows whose period of gestation did not exceed 286 days, produced

233 cow calves, and of bull calves 234; while from those whose period exceeded 286 days, the cow calves were only 90, and the number of bull calves was 152. This certainly gives some support to the opinion so prevalent among farmers, that when a cow exceeds the usual time, the produce will be a bull calf.

Fourth. There were 7 cases of twin cow calves; 5 cases of twin bull calves; and 11 cases of twin cow and bull calves. Earl Spencer has never had a case in which the sexes were different, in which the heifer was a breeding one; they have uniformly been what are termed *free martins*. The cattle of which the above record has been kept, are the pure improved short horn breed, and one of the finest herds in Great Britain.

THE SHAWL-GOAT IN EUROPE AND AUSTRALIA.

From the Penny Magazine.

The great price paid for a Cashmir shawl has led some enterprising individuals to attempt naturalizing in Europe the animal which produces the wool from which those shawls are made. It was very properly observed, that much of the cost to the European purchaser was attributable to the great distance the article had to be brought, and to the high and arbitrary duties paid upon it, both for manufacturing and transporting. An extract from the journal of a French traveller will show how the matter stands between the producer and the buyer. The wool is first combed from the animal in the mountains of Thibet, where it is sold for nearly five shillings a pound: it is packed in baskets and sent to Cashmir, where it pays a duty on entry. It is there bleached with rice-flour, spun into threads, and taken to the bazaar, where another tax is paid upon it: the thread is then dyed, the shawl is woven, and the border sewed on; but the weaver must not sell his work, he must carry it to the custom-house, where a collector puts on any tax he pleases, and in this he is limited only by the fear of ruining the weaver altogether, and consequently losing any future profit. All the shawls intended for Europe are now packed up and sent to Peshawar across the Indus; this part of the journey is generally performed upon men's backs, for the road is in many parts impassable even for mules, being across deep precipices which must be traversed by swinging bridges of ropes, and perpendicular rocks which are climbed by wooden ladders; at each station of this long traverse, which lasts twenty days, a tax is paid, generally arbitrary, but seldom much exceeding 2l. sterling on the whole journey. From this point until they come near the confines of Europe, in addition to the many custom-houses at which they must pay tribute, these unlucky shawls have to encounter the dangers of almost continual anarchy in Afghanistan, and the risk of pillage in Persia by the Turkomans and Kirghiz, whose forbearance must be purchased at a high price. After leaving Persia many shawls get to Europe over the Caucasus and through Russia; but the largest number reach Constantinople through the Turkish provinces, and even then they have a tedious journey to perform before they reach the wearer. Although this statement may not be per-

fectly accurate, the great increase to the original price caused by the route taken is undoubted, and a knowledge of this fact stimulated the exertions of those persons who proposed to breed the shawl-goat in Europe. The animal was not quite unknown. In the 'Penny Magazine' for 1833, an account of one was given from a specimen in the Jardin des Plantes at Paris, which was received from Calcutta, where it had been bred from a couple brought directly from Cashmir. But a whole flock was wanted, not a single individual; and as the attempt to bring any number of these animals by land from such an enormous distance as Thibet was deemed impossible, every inquiry was made as to the probability of getting a supply from some of the wandering pastoral tribes who in their migrations might occasionally touch on the confines of Thibet, and sometimes reach the steppes of Asiatic Russia. Under the French empire, persons were sent to the fair of Macarief (since removed to Nijnei Novgorod) to make inquiries of the Asiatic merchants who annually assembled at that great mart, and they learned there that flocks of Thibet goats were numerous in the steppes of Russia. Although circumstances prevented any steps being taken to procure flocks at the time, the information thus obtained proved very serviceable in directing an expedition which was fitted out several years afterwards for the purpose of purchasing some.

The gentleman selected to take charge of the expedition was Monsieur Jaubert, whose knowledge of the Turkish language and character peculiarly fitted him for travelling through countries peopled by Turkish tribes. Monsieur Jaubert left Paris in April, 1818, and proceeded towards Asia, through Southern Russia, by Odessa, Taganrog, and Astrakhan. On his way he received much information from merchants of Bukharia and Armenia, and ascertained that a handsome race of goats with brilliant white fleeces was to be found among the Kirghiz tribes, who wander in the plains partly surrounded by the great bend of the river Ural or Yaik, which divides Europe from Asia. Samples of the down from these animals were shown him, and he found locks of it scattered here and there in parts of the steppes between Astrakhan and Orenburg, which convinced him that he was in the track of the genuine shawl-goat; this was further corroborated by the designation of *Tibet*, by which name the animal was known to the native tribes. He soon found large flocks of the goats in possession of the Kirghiz, and of them he purchased nearly thirteen hundred, with which he prepared to retrace his steps. The home journey across the plains of Russia appears to have been injudiciously timed; it was begun at the setting in of winter; the goats crossed the Volga at Tsaritain, nearly 300 miles above Astrakhan, and proceeded to Taganrog, where it was intended to embark them; but, as might have been expected, the sea was frozen, and it was found necessary to drive them on to Caffa, which they reached on the 24th of December, nearly 300 of their number having died by the way of cold and fatigue.

At Caffa the flock was divided into two portions; one of these, consisting of 566 goats, was put on board a Russian vessel, which arrived at Marseilles about the middle of April, 1819; the remainder embarked on board another vessel with

Monsieur Jaubert himself, and reached Toulon towards the end of April. No further account has reached us of this latter portion of the flock, but ample details concerning the division which landed at Marseilles has been given by Monsieur Tessier, who was commissioned to receive the animals as soon as they should leave the lazaretto, where they were shut up on landing, according to the quarantine regulations. M. Tessier found the poor creatures in a wretched state; they had been packed together in the hold of the vessel, where no fresh air ever reached them; and the space they had to move in was less than the length of their bodies. This treatment had produced disease in almost all the flock; the hair was dropping from them, and it was found necessary to shear off what remained. They also suffered from convulsions; but the most fatal malady with which they were attacked was a tubercular consumption, from which great numbers perished. A close lazaretto was not calculated to remove the complaint, and many deaths took place daily during the thirty days they were confined. "We have saved but very few," says M. Tessier, "and only such as had slight attacks; the remedy employed was flour of brimstone mixed with their food."

The animals that escaped these multiplied ills were soon removed to more congenial situations; some were placed in the royal bergerie near Perpignan, at the foot of the Pyrenees, some in the hilly country about Toulon, and others farther to the west in the departments near the Rhone. The whole number surviving of both flocks when Monsieur Tessier wrote his account (August) was about 400; they were then generally in good health, their hair had grown to a considerable length, and the valuable down had begun to show itself.

The shawl-goat was thus naturalized, and subsequent experience has shown that the down produced in Europe is not inferior to that of the original Thibet stock. Fears were at first entertained that this could not be the case: it was said that the breed obtained was not pure, that it had degenerated; and a letter from Moorcroft, written in the beginning of 1822, at Ladakh in Thibet, seemed to confirm the suspicion. He says, "France has, I learn, procured a flock from some of the steppes near the Caspian, which must be inferior to those of Thibet, as lately Aga Aabdi was employed by Russia itself to procure the breed from the borders of Chinese Turkestan." But these fears were unfounded. A more serious evil was the small quantity of wool produced by each goat, which on an average amounted to less than three ounces; and the high price paid in Thibet for the raw material proves that the defect is in the original species. Such a small produce precluded all hope of making a profit by rearing the animal, and the scheme would have failed had not the intelligence of an enlightened Frenchman overcome the difficulty. Shortly after the arrival of the Thibet goats in France, several specimens of the Angora goat were brought into that country from Persia; one of these animals, belonging to the Duchess of Berri, was seen in 1822 by Monsieur Polonceau, proprietor of several of the Thibet goats. The length and silkiness of the hair of this goat were extraordinary, and Monsieur Polonceau judged that a cross be-

tween the two races would be an improvement to both: the experiment was tried, and it succeeded beyond his most sanguine expectation. Instead of the minute quantity of three ounces, or even less, several of the mixed race furnished thirty ounces of down in one season, and the average produce of his flock was above sixteen ounces: this was not at the expense of quality; its silkiness was greatly increased, it was finer and longer in the staple, and it had all the peculiar softness of the original stock. It was also found that the mixed race was more robust, more easily fed, and, what was of equal importance, it was less headstrong than the common goat of Europe, and could be managed as easily as a sheep; while at the same time it was active enough to seek food in such steep places as would be inaccessible to sheep.

The great step was now made, and there would be little difficulty in diffusing the improved stock. The unmixed race had already been brought from France into England by Mr. Tower, and located, in 1824, at Weald Hawl, in Essex, where it rapidly increased, and was in every respect like the French parents. In the year 1828 three shawls were made at Paisley of the wool of Mr. Tower's flock; and they were judged by a committee of manufacturers to be superior to any brought from France. But the produce did not increase; it was still barely three ounces, and ten goats were required to furnish wool enough for a shawl of a yard and a half square. Englishmen therefore began to turn their attention to the mixed race; but the importance of wool to our Australian colonies, and the very great improvement which has been invariably produced in the fleeces of sheep exported thither, naturally induced speculation in that quarter. Mr. Riley, an enterprising proprietor of New South Wales, saw Mr. Ternaux's flock of pure Thibet goats at St. Ouen in 1828, but the small quantity of their produce deterred him from attempting so long a voyage with so little prospect of advantage. He was then recommended to visit the crossed race of Monsieur Polonceau at Versailles, which he did, and was at once convinced of its superiority: he was very anxious to purchase some of them, but the desire of Monsieur Polonceau to increase his stock, and to continue his experiments on a large scale, made that gentleman unwilling to part with any. Mr. Riley was consequently compelled to defer the execution of his object until his next voyage to Europe, which was at the close of 1831. He then visited Monsieur Polonceau again, found his stock greatly increased, and his expectations fully answered. He prevailed on that gentleman to sell him ten females and three males, all of which he conveyed safely to London. We regret we are unable to furnish the result of Mr. Riley's endeavors. The last account we have seen is a letter dated London, March, 1832, written to the Society of Arts by Mr. Riley, who had returned from France with his little flock, and was then carefully preparing them for their voyage. At that time some of the females had produced young, which was the seventh generation from the original cross. The Society presented Mr. Riley with their gold medal for his valuable endeavors.

The crossed race, like the pure stock, begins to show a little down early in September, and sheds it spontaneously in March; it is therefore evi-

dently a provision against the cold of winter, which in Thibet, as in Europe, extends from September to March. In New South Wales these are the summer months, and it would be interesting to ascertain whether the goats will continue to produce their warm covering at the accustomed time, or if they will change their habits with the climate. Possibly, like some flowers brought from the northern to the southern hemisphere, or *eice versa*, they may for a few seasons continue their primitive habit, and then suddenly change it; or the old ones may continue the original habit, and those born in the southern hemisphere adopt the one congenial to their new abode. In any case there is little doubt that the shawl-goat will be a valuable addition to the stock of the colony.

ORCHARD DESTROYED BY CANKER WORMS.

From the Hartford Courant.

The orchard of Mr. Jabez Giddings, of Rocky Hill, has been overrun with worms for seven years—and is now entirely killed; so that he has determined to cut it down. Thus he has, by these insects, been deprived of seven years' fruit, and finally of a fine orchard,—which he is now under the necessity of clearing off—all for the want of a little care and labor. By spending an hour per day for six months in the year, and \$1 per annum for tar, an orchard of 50 trees might be preserved. The expense of this operation would not be more than \$20 per annum to any farmer, and most of them would perform it with their own hands, without being felt. The result would be the preservation of the trees, plenty of fruit for family use, and a surplus that would bring at least \$50 a year in the Hartford market. The fruit used at home is a full compensation for carrying the remainder to market. According to this calculation, the balance, in 7 years, is \$210 loss, besides interest. But an orchard that produces an annual income of \$30, is as good as \$500 at interest—this being added, makes Mr. G.'s total loss from neglect, over and above all necessary expenses for preservation, not less than \$750—or on an average of \$107 per annum—more than \$2 a year for each tree suffered to be overrun by canker worms.

POULTRY.

From the New England Farmer.

When, says M. Bosc, it is wished to have eggs during the cold season, even in the dead of winter, it is necessary to make the fowls roost over an oven, in the stable, in a shed where many cattle are kept, or to erect a stove in the fowl house on purpose. By such methods, the farmers of Auge have chickens fit for the table in the month of April—a period when they are only beginning to be hatched in the farms around Paris, although further to the south. It would be desirable that stoves in fowl houses were more commonly known near great towns, where luxury grudges no expense for the convenience of having fresh eggs."

ANTIDOTE AGAINST MICE.

From the New England Farmer.

Mr. M'Donald, of Scalps, in the Hebrides, having some time ago suffered considerably by mice, put at the bottom, near the centre, and top of each of his stacks of grain, as they were raised, three or four stalks of wild mint with the leaves on, gathered near a brook in a neighboring field, and never after had any of his grain consumed. He then tried the same experiment with his cheese, and articles kept in store, and with equal effect, by laying a few leaves, green or dry, on the articles to be preserved.

WHEAT CULTURE.

From the Cultivator.

Of all the crops cultivated in the northern or middle part of the United States, *the crop*, par excellence, is unquestionably wheat. Its intrinsic value as an article of food, its importance as an item of export, its influence on trade, and its vast sway in regulating the exchanges and commerce of the world, render it every where a crop of the greatest consequence, and particularly so in this country. To raise good wheat many things must be kept in view; the nature and texture of the soil—its quality, so far as richness or poverty is concerned—the kind of wheat most suitable for cultivation under the circumstances of the case—the cleanness and preparation of the seed—the time and method of sowing—and in short all the things that go to ameliorate the soil and secure a crop, must be attended to, rendering the growing of wheat one of the most arduous as well as profitable occupations of the farmer.

A good wheat soil always contains considerable clay, but it is so balanced and corrected by other ingredients as never to be cold and sour; if such is the character of any soil, good wheat need not be expected. Freedom from superfluous moisture or stagnant water, is an indispensable condition of a good wheat soil; and when such exemption does not naturally exist, it must be produced by draining. A moist cool climate is found not to be unfavorable to wheat, if the roots are preserved from stagnant water, and are allowed to range in a pervious soil; but in any climate wheat will fail where the soil is saturated with water that does not circulate. To give the requisite dryness and depth where they do not exist, draining and deep ploughing may be relied upon, and where these go together, with proper manuring a soil can scarcely fail to improve, or to be productive.

Deep ploughing, on most lands as they naturally are, and on all lands as they should be made, is essential to good wheat crops. The roots of this plant penetrate in a permeable soil to a great depth and spread to a considerable distance. The single fact of its being provided with two sets of roots, one of which spreads near the surface, and the other strikes deeply, is a sufficient proof of the necessity which exists for deep ploughing in its culture. In a few instances subsoils may be found which will not admit of deep ploughing, being composed of materials injurious to the wheat crop; but great crops of wheat are not to be expected on such soils.

The application of manures is a very essential point in growing the wheat crop. Land can be too rich, as well as too poor for wheat, or rather the manure in the soil may be in that condition which renders it unsuitable for wheat. There are some crops on which fresh or unfermented manure exercises a good effect, and to which it can scarcely be applied in too large quantities, corn for instance; while on others they produce results of the most unfavorable kind. Nearly all the cerealia are injured by fresh manures, the stalk growing too vigorous, while the berry is usually imperfect. Compost manures, or such as are made by layers of turf, stable manure, vegetable mould, lime, &c., in which the decomposition is already effected, can scarcely be applied too abundantly to land otherwise well constituted. The great crops obtained around old barns, or other decayed or removed buildings, is a proof that large quantities of decomposed manure may safely be used, while a much less quantity of fresh or undecomposed would be fatal. One of the greatest evils of direct manuring for the wheat crop arises from the liability of the grain so manured to lodge. The rapid growth of the stem renders it unable to support its own weight, it is soft and flexible, contains much less silica than those grown in a poorer soil; the wheat does not usually perfect its berry, and at all times, from the thinness and weakness of its skin or cuticle is more liable to mildew or rust. These things render it certainly inadvisable, unless the land is very poor and reduced, to apply unfermented manure to wheat.

The rotation of crops, has furnished the means of applying fresh manure advantageously to crops, and at the same time retaining its principal value for wheat. The cultivation of corn or roots in alternation with grain crops, clover, &c., gives the farmer the means of greatly increasing his crops, and at the same time constantly improving his soil. It may be considered as a settled maxim in agriculture, that land improves little or none while nothing is growing upon it. It is the general acknowledgment of this truth, that has substituted hoed or green crops for naked fallows, in the preparation of lands for wheat. Peas and clover are among the best green crops to precede wheat, and the latter may be considered inseparable from the successful culture of this grain. Corn would be one of the very best crops to precede wheat, could it in all cases be removed from the land in season to get in the wheat properly. The thorough manuring and tilling required for corn, puts the ground in good condition for wheat; and should experience prove that *very late* sown wheat is more safe from danger in winter, and more productive than that sown a little earlier, a result said to be established in some of the best wheat countries of Europe, the crop of corn would cease to be objectionable, and might be considered as nearly a clear gain.

There is a practice which has prevailed to a considerable extent in our wheat producing districts, of growing wheat after wheat several times in succession. Such a system of farming deserves the severest reprehension, and will never be adopted, except by those who are in a haste to be rich, no matter at what price, and in defiance of acknowledged consequences. Farmers may have succeeded in raising good crops in this way, where the soil was of the fine quality and excellent adaptation to wheat of much of our western land, but

nothing short of the most imperious necessity can justify this procedure, or tolerate such a departure from the correct principles of cropping. Land, which has once produced good crops of any kind of grain, may again be made to produce them; and underskilful treatment lands would never cease to yield good crops, where their first cultivation proved the adaptation of the soil to that particular one. The worn out and exhausted soils of New-England can be made to produce as good and as plentiful crops of wheat as they formerly did, but the labor and cost of restoring would be infinitely more than would have been required to have kept them continually fertile and productive. Crops have a specific food, which may be more or less plentiful in a soil, and without which they cannot be brought to perfection. Take for instance a worn-out eastern farm. A liberal supply of fresh manures will give all the growth necessary for a great crop of wheat; but will it fill the berry? will it make such flour as the wheat of western New York? We know it will not. The principal essential to the perfection of grain can only be restored by time and skilful cultivation to such soils; it would be wise then, where it exists, to prevent its decrease or its exhaustion.

It is unhappily too true, that on a large portion of our best cultivated wheat lands, the soil has become so infested with a variety of foul and noxious plants, that a course of naked summer fallow, thoroughly performed, has become necessary to counteract them, and prevent their increase and spread. On clean soils this would not be required, but some valuable crop might take its place, and thus add essentially to the profits, while it lessens the labor of the husbandman, so far as the operation of summer ploughing was concerned. The only alternative of such fallows is hoed crops, and these must of necessity for the reasons before given be too limited, to seriously affect the propriety of fallows on weedy land. Spring crops, such as barley, oats, spring wheat, or even peas, do not allow of sufficient cultivation to check the spread of weeds. The sowing of such crops on land where the Canada thistle for instance abounds, is precisely the treatment to make it spread and flourish. The thistle, stein kroot, charlock, &c. will succumb only to ploughings and hoeings so often repeated that the mutilated plant has no time to recover from one blow before another is given.

The preparation of seed, and the quality of that sown, are objects of the greatest consequence. In the most favored sections of our country there are but few fields of wheat in which smut cannot be detected, and in a country so favorable to the perfection and purity of this grain, as the best wheat districts in the United States are, none at all should be suffered. In Europe, continual care is requisite to keep their wheat free, and in the best wheat countries the crop is almost wholly exempt from smut; here but a trifling attention is requisite and the consequence is, it is found almost every where, and in some places to the serious injury of the crop. Now it is well understood, that soaking or washing wheat in brine, and drying it with caustic slaked lime; will effectually prevent smut, as well as benefit the crop in other respects; to sow wheat therefore, without such preparation, is voluntarily to incur the risk of smutted wheat, and the inevitable consequent loss. There are some other substances that used as a wash for wheat

appear to possess the power of destroying smut, such as copperas, vitriol, arsenic, &c., but as none are more certain in their operation, or can be used with less trouble or danger than lime, the application of that substance is undoubtedly to be preferred to any other.

The kind of seed used, and its quality, are things of too much consequence in the culture of wheat to be left to chance. There are many varieties of wheat cultivated, some very productive, and some very hardy; some ripening later and others earlier; and these kinds in sowing should be chosen with reference to the soil and location. Varieties which ripen at the same period, may sometimes be advantageously mixed, for sowing in the same field; but those that ripen unequally should be carefully kept separate. Some varieties of wheat may stand in the field longer than others before cutting, without danger of the seed shelling or wasting. Thus of the two kinds of flint wheat, the white and the Canadian, (the latter a comparatively new variety,) if the last should be allowed to stand after arriving at maturity as long as the first can be permitted with impunity to do, the loss by shelling would amount to no small portion of the crop. The first may stand almost to suit the convenience of the husbandman, while the last must be cut as soon as its maturity will admit, or certain loss will be incurred; and nearly the same remarks will apply to some other kinds. There are some farmers who seem to think that any thing that is in the shape of wheat, however imperfect or defective the berry, if it will only grow, may be used as seed. This is very mistaken policy. It is impossible that the young plant should be as vigorous and as perfect, when springing from defective and shrunken seed, as when growing from that in which the peculiar principles of the plant are fully developed, and the germination commences without check or hindrance. The seed that ripens first in the ear, and is separated with the greatest ease, is the most proper for seed, as these circumstances show it is the most mature. A farmer in one of the northern states, a few years since was in the habit of selling large quantities of seed wheat annually and at high prices, as his wheat was of a superior quality, very heavy, and productive, and supposed to be a new variety. It appeared, however, that he had brought his wheat to that degree of perfection, by selecting some of the finest ears from a field in the first place, and then instead of threshing the whole crop grown and using the seed promiscuously, he gently beat the sheaves over a barrel, by which only the best and most perfect grains were separated, and by repeated sowings had rendered the qualities so desirable permanent. The quantity of seed sown differs much in different parts of this country and in Europe. Perhaps the English use a greater amount of seed than any other people, and their crops are certainly not often excelled. From two and a half to four bushels per acre are there used; while here the quantity varies from one to two and a half bushels per acre. The general quantity is about a bushel and a half. Where wheat is sown late, more seed is required, as the wheat does not tiller or spread as much as when sown early; and when the berry is unusually plump and full, more is required than when the kernel is lighter. As on soils, too, that are not rich, a single plant will not throw out as many stalks as where

the land is very rich and fertile, it would seem that on such lands more seed would be necessary to seed it properly; as it is clear that where but one or two stalks shoot from a root, these must be more numerous than when a root produces half a dozen.

Opinions among farmers have been somewhat variant on the subject of changing seed; but we think unless more pains is taken to originate and preserve good seed on a farm, than now usually is, there is essential benefit derived from such changes. Wheat is certain to succeed better on lands not naturally adapted to its production, when the seed is brought from a good wheat soil or district. For many years the farmers of large sections of the western district of New-York, where the wheat crop at that time was apt to fail or smut, found a profit in sending some twenty or forty miles to procure seed from the best grain districts, and the crop from such wheat rarely failed in producing grain of good quality. There is also a decided advantage secured in bringing seed from lower land and a milder climate, to elevated lands, or a cold moist climate. Such a change of seed renders the mountain crop earlier and better than it would be if seed from the same neighborhood was used. Professor Brown has on this subject the following remarks, which are undoubtedly correct, as they are founded on the experience of husbandmen in the high and low lands of Scotland:

"We are convinced that the cultivator of a mountainous district, if he always used seed from his own crops, would reap later and later harvests, so that at last they would with difficulty be brought to maturity; a circumstance easily explained by the comparative shortness of summers in mountain districts. If, on the other hand, the cultivator of a flat country, the climate of which is mild, and the soil dry and light, continually made use of his own seed, it would head every year sooner, the stalks would become shorter, and the heads and grain smaller and smaller, and in time there would result but a poor produce. In this last case, the cultivator brings his seed with advantage from a country or district more cold, the soil of which is good and substantial."

The instances in which benefit has been derived, on what are called beech and maple lands, by using seed from oak lands, are so numerous that almost every one must be familiar with them. The advantages in this case, however we may choose to explain them, cannot with propriety be disputed.

As to the time of sowing wheat, it may be remarked, that very early sown wheat gets more firmly rooted, than later sown, and in consequence is less liable to injury from freezing out. Wheat may be sown so late, as not to germinate until the severity of the winter is past, or the greatest danger from frost is gone by; but such late sown wheat is far more liable to the attacks of blight or rust than that which ripens early, or which is so far advanced before the close, hot, showery weather, that marks the advent of blight, commences, as to be safe from injury. On the other hand, late sown wheat is very certain to escape the Hessian fly, which in some parts of the country is the greatest enemy wheat has to encounter. It would seem, then, that where wheat is liable to winter-kill or blight, early sowing is to be preferred; and that where the fly is prevalent, sowing should be delayed as long as possible. It may be

added, that some experiments would seem to prove, that in districts where the wheat-worm has been so fatal to spring wheat, very late sowing, by delaying the earing of the wheat until the period of the worm-fly was passed, would preserve the crop.

There is more wheat lost to the husbandman from the single cause of winter-killing, or freezing out of the ground in winter or spring, than there is in this country from all other causes put together. The worst period is in the months of February or March, when the ground is bare of snow, and thawing mild days are succeeded by sharp freezing nights. This freezing expands the surface water, lifts the roots from their place a little at each time, and by successive freezing and thawing, leaves the plant without any hold upon the soil, and consequently to perish. Heavy soils are more apt to winter-kill grain, than gravelly, or light ones, as these can retain little water. It would seem to be a necessary inference, then, that thorough draining such soils as are apt to winter-kill wheat, would prove a remedy, and theory and fact in this case are found to agree. We have lately had the pleasure of seeing beautiful fields of grain growing on lands, from which a few years since the production of wheat would have been impossible. Thorough draining had removed the water that formerly saturated the soil, and by freezing the surface, prevented the lifting out process that always accompanies the freezing of wet grounds. It is usually the case that such wet grounds contain a large supply of vegetable matter, and draining renders them so productive, that the profit of a single crop not unfrequently repays all the expense incurred in the improvement, leaving the land, which in its former state was nearly worthless, a clear gain to the husbandman. If on common farms the means of trench or thorough draining are not at hand, surface drains made in such a manner as to carry off the water that falls on the land, should be constructed immediately after the sowing is completed. By preventing such water remaining in, and consolidating the land, grain is less liable to be thrown out; and though far less beneficial, or permanent in its effects, than thorough draining, surface drains should not be omitted where there is the least danger from excess of water.

POTATOES FROM THE SEED.

From the Cultivator.

Messrs. Gaylord and Tucker—One of your subscribers has made inquiry, as to the mode of raising potatoes from seed, for the purpose of procuring varieties: will you accept the following as a reply?

The saving of seed requires in the first place some little attention: being contained in a capsule of pulpy matter, it is necessary that it should be separated therefrom, by washing and drying, in the same way with cucumbers, melons, and some few other seeds, similarly produced; and then to be kept free from moisture till the following spring, or until when wanted, as thus saved it will keep good many years.

In order to its cultivation, in the month of April prepare a bed, in a portion of the garden that has

been manured the previous year, in the usual course of cropping, and the soil being well pulverized, open drills, about a foot apart, into which drop the seed thinly; cover with the rake, and beat down gently with the back of the spade, so as to close the particles of earth, and afford little access to the small black skipping bug, so injurious to the seed leaves of turnips and cabbage, which are equally pernicious to this crop, and require to be restrained from their depredations, by the best means in the grower's knowledge. When the plants have attained about half a dozen leaves, hoe, weed and thin them out, to three or four inches distance: the supernumeraries, taken up with a ball of earth to their roots, may be transplanted safely into a separate bed, and give the cultivator a fairer chance of the improved variety, and do away with the idea that may otherwise intrude on the imagination, that the better kind may have been lost in thinning.

Following the nature of the potato, the vine will now grow rapidly, and in a fortnight will require a second weeding, to be followed with what in farmer's language is called, earthing up; and it then remains only to watch the period of decay or ripening of each plant, as some will reach their maturity early, and others will continue growing till the arrival of the autumnal frosts. It may be satisfactory and useful to notice these periods, and contrast them with their times of ripening the successive year, and thus identify them, as an early or late sort. They will now have to be carefully harvested, each root having its produce kept separate, and placed out of the reach of the winter's frost, for the next year's culture; for this purpose, it will be advisable to employ a flour barrel of dry chaff, into which the potatoes are to be packed, each sort previously wrapped in paper and thus secured from mixture with another. In the ensuing spring they must be again submitted to the earth. The growth of this year involves no little care and trouble. Separate the early from the late, and dwarfs from those of more luxurious growth, and prepare the ground as before. If you plant in hills, those with the longest haum will require a distance of three feet; if on the contrary you drop them in furrows, the same distance will be needed from furrow to furrow, lessening the space as the plants decrease in the length of the vine to two feet. It may be as well also before planting, to take off a small piece of the peel to ascertain the color, the prejudice being in favor of the white potato over a yellow, and a yellow over a black, for there are all manner of varieties of hues, both externally and internally, and it would be useless to grow those which are quite black. Four or five tubers, where there are as many, will be sufficient for this year's cultivation, and as years are consumed in this undertaking, it will be necessary to commence an early system of experiment: for this purpose, of each sort plant a tuber whole, next a half, then two eyes, and lastly one eye, (Rohan fashion,) the distance between the planting when in drills from 6 to 8 inches, and if means are within reach, it would be proper to try as far as may be the effects of different soils on each potato, as the light, the heavy and the medium. No further directions are necessary for this year's culture; they are treated as potatoes, and will at harvest have attained their full growth and may be introduced into the kitchen:

for although popular opinion gives three years for a potato to acquire its proper qualities, the foundation of which is perhaps more in the mystery of numbers than in real truth, yet as it will have reached its natural size, I can see no reason why it should require another year to develop its other properties. Should the experimenter resolve to put faith in popular sayings, it will be necessary, in harvesting, once more to separate the sorts and repeat the experiments he has just gone through, and any others that may occur to him.

The chief points of goodness or value in a potato, are a white color, a good size, smooth skin, with eyes or shoots gently depressed; there is a preference also for a kidney shape; the tubers should grow close to the stem, be numerous and keep well, and the haum or vine be short; and finally, above all, the potato must cook mealy: a combination of these points, would be the perfection of the root. To attain such a consummation, has been the continuous effort of the last nine years of the writer's life; that he has not accomplished his object, has been the result of a concurrence of unfavorable circumstances, an over fastidiousness to attain the most of the favorable points, and a soil unfavorable to the culture of the potato, stiff, cold, and clayey. Roots, that have promised well in the light soil of garden culture, have failed, when cultivated in the field; hundreds of sorts have been rejected on the score of color, the white only having been selected; length of stalk has condemned many, and perverseness, or incongruity of shape, with rude shoulders, &c., many more; and I confess that the celebrated Rohan would have incontinently been condemned to the hog-pen, had it been first raised by the humble individual who now addresses you. I have not recommended manure for the seed beds, as I have found an over rich soil raise anticipations, which were not realized in culture on a large scale. Much care is requisite to the safe keeping of the roots through the winter: the only sort I continue to grow, I had nearly lost some years back, by an early frost in November, which continued with so much unexpected severity, that I lost fifteen bushels, as I thought my whole stock; but fortunately one potato remained in the ground, and was preserved by the accidental dropping of a portion of salt hay on the spot where it lay. I was obliged to commence operations afresh, after having just raised sufficient seed to warrant the expectation of a full crop the succeeding year, for the market. I mention this to impress on the grower, a due care. It remains to be observed, that the experiment is quite a lottery. Five and twenty years since, I was fortunate the first trial; the last nine years I have industriously persevered, and from a thousand plants, have only saved one as deserving of culture, and that far from my ideas of a perfect plant. The fault lies in my seeking for too much, and looking for too many good qualities in the object of my experiment; many valuable potatoes I have thrown away in search of that which perhaps is not to be found. With more moderate expectations, I might have been more successful, and perhaps on a lighter soil, might have obtained my object; my want of success must not deter your inquirer from making the attempt. I still continue on a small scale. I have been led to prosecute a variety of experiments,

which, if they have not afforded profit, have supplied me with a fund of amusement, and probably some little increase of knowledge.

THE SCHOOLMASTER ABROAD.

DRY MEASURES OF CAPACITY.

To the Editor of the Farmers' Register.

Very few things are more useful in house-keeping than such articles. Yet, I believe, it may truly be said, that very few if any families are provided with more than one or two of them: say, a half-bushel, which rarely agrees with the standard, and something called a quart-can, together, perhaps, with one which is supposed to contain a pint. These last, however, are always of the wine measure size. Consequently, every one who receives any dry article measured by them—meal or flour, for instance—loses very nearly ten cubic inches in every quart which he purchases, there being that difference between the wet and the dry measure quart. But this is not the worst of it; for I believe that almost all, probably all the measures we make for ourselves, (if indeed we make any,) of a smaller size than the half-bushel, such as the peck and half-peck measures used in our mills, are graduated by the tin quart-cans which we purchase from the tin-shops, and never think of examining so as to ascertain what they contain. I know not what is the cause of this carelessness and neglect, unless it be, that most house-keepers are either too lazy, or too ignorant of common arithmetic to direct the making of their own measures, especially in a round form, and so leave themselves entirely without any. But be this as it may, I have thought that I might perhaps render an acceptable service to some of our agricultural brethren, as well as to others, by furnishing them with the dimensions of boxes nearly square, which would contain the following quantities: a bushel, half-bushel, peck, half-peck or gallon, half-gallon and quart—barrel (of 5 bushels) and half-barrel. All these can easily be made by any common carpenter, who can use the ordinary tools of his vocation, and can procure a small quantity of very well seasoned plank of some wood which is least liable to shrink and to swell.

You, my good sir, and many others know, that no measure of capacity can be made with absolute accuracy, for reasons with which it is needless here to trouble your readers in general, and I shall therefore omit them. But the fractions in the measures here given, are quite near enough for all common purposes, as all of them come within a very few parts of a cubic inch of containing the exact quantities which each is designed to contain. None are in use of greater accuracy.

Dimensions.

- A box 16 in. by 16.8-tenths and 8 in. deep will contain a standard bushel or 2150 cub. in. 4-tenths.
- A box 12 in. by 11.2-tenths and 8 in. deep will contain a half-bushel or 1075 cub. in. 2-tenths.
- A box 8 in. by 8.4-tenths and 8 in. deep will contain one peck or 537 cub. in. 6-tenths.
- A box 8 in. by 8 and 4.2-tenths deep will contain half a peck or 268 cub. in. 8-tenths.
- A box 5 in. by 5.6-tenths and 4 in. deep will contain half a gallon or 134 cub. in. 4-tenths.

A box 4 in. by 4 and 4.2-tenths in. deep will contain one quart or 67 cub. in. 2-tenths.

A box 24 in. by 16 and 28 deep will contain a barrel or 10752 cub. in.

A box 24 in. by 16 and 14 deep will contain half a barrel or 5376 cub. in.

If those who may wish to use the foregoing measures, which are not to be found in any book that I have ever seen, will only copy them in their pocket-books, (should their memories be too short to retain them,) they may always be prepared with plain directions for making them, without the trouble of referring to your Register. I venture to give this admonition, because I know, by long experience, that many of us will rather go without any information we may want, than walk a few steps after a book in which we are certain it can be found. Such is the *vis inertiae*—the highly culpable mental torpor of thousands among us, who will make no effort to correct this shameful fault, although daily sensible of its existence, and very frequently suffering, not only inconvenience, but considerable injury from its influence. But I must forbear to moralize farther on such a subject, lest some of your critical readers may accuse me of "travelling out of the record" farther than need be. I will therefore conclude with renewed assurances that I shall ever remain yours, very sincerely,

JAMES M. GARNETT.

From the Carolina Planter.

ON PREPARATION OF MANURE.

Fairfield, Sept. 1st, 1840.

To those planters who are desirous of pursuing the system of manuring systematically, perhaps a few hints thrown out at this time may prove eminently useful. The period at which I usually commence making manure for the ensuing year is immediately after the planting of my cotton. There generally occur some days of leisure, between the planting and the working of the crop, which I devote to the raking of leaves and hauling and depositing them in my stables and cow-lots. The leaves which are deposited in the spring will be thoroughly trodden and rotted by the summer, and as soon as the crop is laid by, my hands and wagons are again employed in making a second deposit of leaves in the lots. My stables at this time are cleaned out, and the dung spread over the lot which is around the stables. This second deposit becomes pretty well decomposed towards Christmas, when the planter is generally near or quite through with his cotton picking, my third and last deposit of leaves takes place at this time, and the stable dung again spread over the compost. Their different layers of leaves and dung are thoroughly intermixed by penning my cattle on them, and the whole mass becomes fit for use by the first of February; at which time, if the grounds are in order, I commence hauling out my manure. The first step in a system of manuring is to become sensible of its advantages by actual experiment, after which its preparation and application become as much a matter of course, as the planting of the crop. So palpably beneficial are its effects, that I have never yet had an overseer, who has not entered with spirit and alacrity into the

system. My practice is to plant my older and thinner lands in corn, and to manure them well, and with such aid, they will yield more than fresher lands without manure. Such a course leaves the better lands to be planted in cotton which is to be considered as the main crop of our southern states. In addition to the manure on my corn lands, I have usually been able to manure from 75 to 100 acres of cotton most convenient to the homestead. Even those of us, Mr. Editor, who have done most in this matter, must feel that we have made but a beginning, and that our resources are as boundless as the leaves of the forest. In the lower country, where the system of manuring has been longer in existence; it is much more extensively and successfully carried on than with us; and several planters of late have gone to the expense of spreading one hundred bushels or more of salt over their compost heaps, and as they believe with decided benefit to the crop. The practice there is to keep one or more boys and carts, according to the size of the plantation, hauling leaves into the lots and stables the greater part of the year, and no doubt where horse power is scarce, that this is the better plan. But with us, where it is so abundant, I think the periodical application of the force of hands and wagons the better plan. But of this, every planter will judge for himself. I would suggest to such of your lower country readers, who have been in the habit of applying salt to the compost heaps, whether it would not be better to feed it to their stock? Would not the urine of such stock be more highly charged with saline properties? Would not those properties be more equally diffused throughout the compost heap in this indirect, rather than in the direct application of the salt itself? And should not the known benefits of salt as food for stock incline them to this course. In my remarks I have confined myself altogether to the use and preparation of compost, and valuable as this manure may be in improving our lands, yet it is a very limited means of improvement, compared with a judicious rotation of crops, and the ploughing in of vegetable matter. This is the system upon which we must mainly rely for an amelioration of our lands, and sooner or later it must be adopted or we shall be driven to the necessity of emigration. As this article, Mr. Editor, is already long, I will make this latter subject the head of a separate article at some future period. PRACTICE.

BOILED FOOD FOR POULTRY.

From the Farmers' Cabinet.

It is customary for some poultry-men to cook the different grains which they use for fattening poultry, and this they do by boiling, continuing the process until the mass swells, and becomes so soft as to break the envelope, by which each grain is surrounded, conceiving that such food is better for the purpose, and the use of it far more economical, than the dry grain. Now, whether this idea is or is not correct, still it is of importance to know the difference of expense between the two, and interesting to ascertain whether more or less of it is eaten than of that which has not been submitted to the culinary process. To discover this, I find that Mons. Reaumur caused four pints

of each of the six grains following to be boiled until they were well bursted, and he found that the increase of bulk of each sort was as follows:

4 pints of oats after boiling filled	7 pints.
4 do. barley do.	do. 10 do.
4 do. buckwheat do.	do. 14 do.
4 do. Indian corn do.	do. 15 do.
4 do. wheat do.	do. 10 do.
4 do. rye do.	do. 15 do.

Rice was not tested, but swells much more than any of the above: it is seldom, however, used for the above purpose.

On experiment it was found that poultry were not uniformly partial to boiled grain, although occasionally a preference was shown for it; nor did it appear that they entertain a decided partiality for one species over that of every other; wheat, however, being sometimes preferred and rye disapproved of; it therefore follows, that we might make choice of that grain which happens to be most plentiful or cheapest, always excepting rye, which must not be used unless other sorts cannot be had.

Other experiments were made to ascertain whether there be any economy in feeding with boiled grain, and this was done by knowing, first, how much dry grain sufficed for one or more fowls and then boiling the same quantity, and trying how much in that state would suffice for a meal; the result was as follows. Rye, although so very considerably increased by boiling, instead of being more satisfying, becomes less so, more of it being consumed when boiled than when dry. Oats, although increased by boiling nearly one-half, are not, on this account, more satisfying for poultry, which, if in two days they will consume four pints of dry oats, will, in the same period, eat seven pints when boiled; so there is no economy in the additional trouble. Mowbray is of the opinion that oats scour, although they are supposed to promote laying, and are in many places used for fattening. Buckwheat swells still more than oats by boiling, but poultry will consume fourteen pints boiled, in the same space of time that four would be sufficient, and it is thought to be an unsubstantial food. But Indian-corn is more profitable when boiled than raw, the saving being one-third, or near it; while the fowls which ate two pints of barley in its dry state, consumed but three pints of the boiled grain; therefore, as ten pints of boiled barley are produced from four pints of dry grain, the experience in dry barley is to that of boiled, as ten-fifths to six-fifths, or as ten to six, or five to three; amounting to a saving of two-fifths by giving boiled instead of dry barley: thus it is far more profitable and effective when boiled than raw, and, if fed to the poultry while warm, it will hasten materially the period of laying, promoting in a high degree the health and thrift of all kinds of poultry. Wheat, as shown in the above table, increases in bulk on boiling, nearly the same as barley; and these experiments go to show that the use of boiled wheat, barley and Indian-corn is a matter of economy, while on the contrary, in the boiling of oats, rye, and buckwheat, you have the loss of fuel, time, and trouble, out of pocket.

These things are worth remembering, especially at the present time, when the fattening of poultry is carried to so great a length, our steam-boats and rail-ways requiring such quantities to feed their passengers, poultry being, in so many ways, the

standing dish of their public tables. For the keeping of poultry before fattening, no food is at all to be compared to boiled potatoes, mixed with a small portion of *boiled barley*, the process of which is very much expedited, if the grain is broken in the mill before cooking; but in that state it will require stirring while boiling, to prevent it from burning.

It is found, by actual experience, that there is no saving in the substitution of bran for grain; some persons take the trouble to boil this, but it does not even increase its bulk, and not at all its quality. Two measures of dry bran, after boiling, will not go so far as one measure of *boiled barley*, thus showing a striking difference in favor of barley, even in point of economy. S.

THREE LETTERS FROM GEN. WASHINGTON TO COL. EDWARD CARRINGTON.

[The following letters are part of a larger number from Gen. Washington, and all in his own hand writing, to Col. Carrington, for the perusal and use of which we are indebted to the kindness of the present proprietor, Henry Carrington, esq. of Charlotte. The few which will be published below, and now for the first time, are selected not as the most interesting, (for, indeed, they are the least so,) but merely because they relate to subjects proper to be embraced in this journal. But though containing nothing of agricultural instruction, for the present time, they possess a different kind of interest, in exhibiting something of old agricultural opinions and practices; and still more as coming from one whose every act and opinion will grow in interest to his countrymen with the passage of time, and the increased remoteness (in respects far more important than merely in time,) from the acts of him "whose like we ne'er shall look upon again."—ED. FAR. REG.]

Mount Vernon, 26th June, 1797.

DEAR SIR—General Marshall, who did me the favour to spend an evening at this place on his way to Philadelphia, confirms the report I had before received of the utility of Mr. Booker's improved threshing machine; and added, that a letter for that gentleman directed to your care, would certainly reach him.

As I am extremely desirous, (and that with as little delay as possible,) to get one or two erected, and had got the scantling for them on the plan of the Scotch machine, used by Mr. Jefferson, Genl. Lee and others, I have taken the liberty of requesting the favour of your care of the enclosed letter—to which I am induced from the consideration of not having possessed myself of Mr. Booker's christened name, or place of abode. I am always and sincerely your affectionate humble servant

Go: WASHINGTON.
COLO. CARRINGTON.

Mount Vernon, 7th July, 1797.

DEAR SIR—I feel myself very much obliged by your kind and prompt despatch of my letter to Mr.

Booker, who, offering to be here between the 20th and 27th of the present month, (if that would suit me,) the enclosed is to inform him that it will, and that I shall accordingly depend upon it; and you would add to the favour already conferred on me in this business by letting it receive a safe, and as expeditious a conveyance as may offer, as he awaits my answer to decide on his measures, and, because I am very desirous of having the machine erected in time.

With very great esteem and regard, I am, dear sir, your most obedient, obliged and affectionate servant,
Go: WASHINGTON.

COLO. CARRINGTON.

Mount Vernon, 2d Dec'r., 1799.

DEAR SIR—Since you mentioned the plaster of Paris which was for sale in Richmond, (but after you left this,) it occurred to me, that as it was not a saleable article with you, it might be my cheapest mode to purchase *there* to supply my want of this article next year on my farms around me.

Permit me, for this reason, to ask the favour of you to learn from the gentleman who has it for sale,—what quantity he has?—the lowest price he would take for it by the ton (the whole being purchased)?—there?—and what, delivered at my landing?—As a merchant, acquainted with navigation, he will be at no loss to know at what freight it could be delivered here.

A gentleman now in Alexandria is endeavouring to obtain subscribers for a vessel load from Nova Scotia;—the terms I have not learned;—but if that in Richmond be *good*, and [can be] had as low, I should prefer it because it is already in the country, and the risks of the sea avoided.

All, however, depends upon its being of the *true sort*—for without this, it would be as useless for the purpose intended, as pebble stones.—There are two colors of it—one has a greyish—the other a bluish cast;—the latter I think is preferred; but both are good when perfectly free from grit, or sand;—having any of the latter is a proof of its baseness.—The best criterion for ascertaining its property, is, by putting the fine powder of the plaster into a skillet or pot without moisture,—the good will swell, or rise up; the bad will remain dead, and motionless.

I would thank you for sending me (if to be had) two glazed leather hats such as your positions wore, and of that size.—Accompany them with the cost, and the money shall be remitted in a bank note.—I am in no immediate want of them;—an occasional, or water transportation (directed to the care of Colo. Gilpin in Alex'a.) will do.

I hope you got down safe.—Our compliments to Mrs. Carrington.—I am always, dear sir, your affectionate and obedient
Go: WASHINGTON.

COLO. CARRINGTON.

STUCCO WASH.

Six quarts of clean lime, slaked in boiling water, 2 quarts of salt, 5 gallons of water—boil and skim, then add one pound of copperas, and $\frac{1}{2}$ lb. pot or pearl ash, gradually, and four quarts sifted wood-ashes—color to taste or fancy: applied while hot.

2d. Clean, fresh-burnt lime, same as above, $\frac{1}{2}$ lb. burnt alum, powdered, 1 lb. sugar, 3 pints rice flour, made into a jelly, 1 lb. clean glue, first dissolved—5 gallons water: will retain its brilliancy for a century.—*Farmers' Cabinet.*

SECOND MEETING OF THE ENGLISH ROYAL AGRICULTURAL SOCIETY.

From the Yankee Farmer.

The English agricultural papers give a detailed account of the second meeting of the Royal Agricultural Society, which was holden at Cambridge on the 14th and 15th of July. This was doubtless one of the greatest collections and greatest displays of the kind that has ever taken place at any time in any country.

So great was the influx of visitors that at midnight preceding the 14th, the town wore all the active appearance and bustle of the day. The operations of the society commenced by a grand ploughing match in a field of upwards of 40 acres. The competition was to commence at 10 o'clock, but before that hour the road was crowded with equestrians, pedestrians and persons of every description and vehicle. There was no dissipation, no disorder, all mingled together engaged in friendly converse from peasant to peer, and although there were upwards of 20 thousand there was not a single robbery nor an attempt made. The prospect from the field was most exciting. It is seated at the base of one of the most commanding range of hills in Cambridgeshire, and presented a wide and vast amphitheatre.

Fifty seven ploughs were entered in competition, each of which had to plough a compartment of 200 yards in length and 60 in breadth. Every man was at his post and the signal for starting was given by the sound of a horn. The match was well maintained, and as it regarded the quality of the work and the time, gave much satisfaction. The judges were mounted on gray horses.

The work having been completed, the ploughmen assembled at the judges' marquee to receive the awards, which were given by the Duke of Richmond, the president of the day. His grace ascended a wagon opposite the council tent, the ploughmen and ploughboys were marshalled in an extensive area, and outside of the ring a great auditory.

In addressing himself to the competitors, the duke expressed his pleasure in having been honored by the gentlemen and farmers in being appointed to present them with the reward of their skill and industry. "It was a gratifying circumstance that their honest merit would receive its due reward. The good conduct and exertions of the ploughmen and ploughboys would now receive the reward, which he was in hopes would influence their future condition. So long as such feelings as were displayed on this occasion existed, England would be happy, flourishing, and free, as she deserves to be.—(Cheers.) It was still a greater satisfaction that not only men, but boys, had competed and obtained a fair share in the prizes. There were amongst the latter two brothers, who had been very successful, and it showed that they had been brought up well. It showed the force of that example which they wished to inculcate in all classes of the agricultural community; it showed

that they had observed the great laws of their country; and, what was still higher, the greater laws of their Creator.—(Loud cheers.) The noble president said that he would not detain the meeting longer, but would proceed to deliver the awards which had been granted by the judges.

The prizes in money were next delivered to the successful candidates, from five pounds each to a sovereign. The Duke of Richmond addressed each in proper remarks, endeavoring to convince them of the necessity of adhering to those principles by which they had been now successful, and holding out an example to their neighbors. His grace also stated that as the committee wished to give encouragement to every exhibitor, who he hoped would be successful on future occasions, they had awarded to each competitor half-a-crown. The President's speech was very effective, and listened to with great attention.

While the ploughing match was going on, there was in an adjoining field an exhibition of agricultural implements. Among the most prominent were four sub-soil ploughs, which have within five years come into general practice. There were in operation thrashing machines, chaff-cutting machines, scarifiers, hand-thrashing machines, drop drills, turnip drills, dibbling machines, crushers, harrows, &c.

There were exhibited 86 different ploughs. Among the best were a variety of mouldboards, and frames and bearings of the ploughs, and the couplings that fasten the mouldboards so constructed as to admit of several shapes being applied, from the most wedge like to those of the most convex or concave surfaces.

Case hardened metal for ploughs seems to have been rather a new thing in England and has made almost a new era in the use of cast iron for that purpose. Till this mode of hardening was discovered, cast iron ploughs were but little used, as they were condemned from their soon wearing thick and forming a bevel.

A portable thrashing machine, manufactured by J. R. & A. Ransom, worked by four horses, thrashed upwards of 60 bushels in one hour. A hand thrashing machine, for the power of four or six men, knocked out five bushels in fifteen minutes in nice order.

Ransom's chaff-cutting machine cuts any length from 1-16 of an inch to 2 inches, if so ordered. It is well calculated for cutting gorse, (*furz*, a thorny plant of the genus *ulex*), and it is well adapted to cutting cane tops.

Biddell's scarifier. This a very powerful implement for the purpose of cultivating land under a variety of circumstances, and bringing it into a proper state of tilth, much more effectually and at less expense than can be done by means generally employed for that purpose.

Portable sheep fold. In the construction of the hurdles, which form this fold, strength and lightness have been studied. There was only one pair of wheels to each hurdle, and the whole may be moved with great facility, by either a man or a lad. They may be instantly connected with each other, and when together form a strong fold. As a temporary division on gentlemen's grounds, these hurdles would not be unequally. By the use of hurdles on wheels the exceedingly injurious effect of setting common hurdles with stakes over land-drains is avoided.

Grass mowing machine. This is for cutting grass on lawns, pleasure grounds, and bowling greens, and is so easy to manage, that persons unpractised in the art of mowing, may in a short time use it with ease.

Hay bay beater. This machine is for the purpose of taking the dust out of mouldy hay, previous to use or being cut into chaff.

Messrs Bond, Turner & Hamblin exhibited a very superior and powerful thrashing machine of four horse power—the manner it performed its work was particularly admired, and which thrashed in a superior manner twenty-four bushels of wheat in twenty minutes, being more by one fifth than any other machine realized in the same period of time.

"The portable hand-power thrashing machine, shown by Mr. B. Urry, of Newport, Isle of Wight, was decidedly one of the most excellent machines of that description we ever had the pleasure to witness. The apparent ease with which it was worked, and the large quantity of wheat thrashed out in a limited period, were the theme of universal approbation."

CREAM-POT CATTLE, AND TEN HILLS FARM.

From the Cultivator.

One of the most attractive places to the agriculturist, in the vicinity of Boston, is the Ten Hills farm, occupied and managed by Col. S. Jacques, and owned by an association principally composed of rich merchants in Boston. The object of the association was to form a stock farm, and a company was formed of one hundred shares of three hundred dollars each, the property held in trust for the owners of the shares. On this money the proprietors receive from Col. Jacques five per cent. annually, or fifteen hundred dollars in the whole. It is a noble instance of private liberality, for the advancement of agriculture. How easily might such a pattern farm be established in any of our rich agricultural counties, if the same spirit of improvement was as operative in them as in Boston. On this farm, Col. Jacques bred the celebrated Merino ram which yielded 42 lbs. of wool at three shearings, an amount probably not equalled by that of any sheep in this country, Merino or otherwise.

But the most interesting object on the Ten Hills farm is the breed of cattle, called by Col. Jacques, the cream-pot breed, and which for richness of milk are unrivalled. The origin of this stock, according to Mr. Colman, was a fine native cow raised in Groton, Massachusetts, but of her origin farther, nothing is known. She was sold to a gentleman near Boston, a dealer in milk, and so rich was her milk, that the movement necessary in carrying it, frequently converted it into butter. Mr. Jacques procured this cow, and by crossing with the short-horn bull Cœlebs, afterwards owned by Mr. Jacques, originated the breed which has since become so famous. Mr. Jacques a short time since informed Gov. Hill, that "this celebrated bull, while in his possession, went to four hundred cows at ten dollars each; and on his head he received in cash thirty-eight hundred dollars." Col. Jacques' improvements have received the test of three generations, and he has

now about forty cows and heifers, and ten or a dozen bulls and bull-calves. The color of this stock is a rich deep red, one of the most beautiful and favorite colors, and of good form and proportions; and in the language of Mr. Colman, "if they continue to display the extraordinary properties by which they are now distinguished, they promise to prove themselves for dairy purposes the most valuable race of animals ever known among us;" and in that of Gov. Hill, "such an animal as the five months' calf, at the price of one hundred dollars, for a breeder, would be capital well invested, if kept only for the use of a farm of a dozen cows."

Col. Jacques' own account of the manner and object in his course of breeding, is as follows: "It has been my object to effect such an improvement in milch cows, as should produce the greatest quantity of rich milk, affording the largest quantity of butter. There is a greater difference in a pecuniary point of view, between a good and a poor cow, than among any other domestic animals. In some yards may be found those that will not produce more than three pounds per week, and others that will make nine, and all on the same keep. As we sometimes hear of cows, which have produced seventeen pounds of butter per week, and even more, it occurred to me to inquire why a breed or race could not be formed with the same valuable properties. This I have attempted; and have carried it to the third generation, and I am confident of success. I have a cow whose milk has produced nine pounds of the best butter in three days; and this on grass feed only. This I call my *cream pot breed*."

It is evident to us that Col. Jacques has adopted the true course in producing a valuable stock. He selected animals combining the qualities he desired to perpetuate in the greatest degree; and in continuing his operations, a selection of only such for breeding as evince the same properties, have been chosen by him. With this precaution, he cannot fail of success. The qualities that in the first instance may have been partially accidental, become constitutional and permanent, and we can see no good reason why the cream-pot stock of Mr. Jacques should not become as celebrated as the short-horns of Messrs. Collings or Berry, to which, indeed, they are so nearly allied.

LIGHTNING RODS FOR BARN.

From the Cultivator.

No sooner is the harvest gathered, and the farmers' barns well stored with hay and grain, than the newspapers are constantly bringing us accounts of their destruction by lightning. Every year the loss sustained by the burning of barns by lightning, is far greater than that of dwelling houses, and more lives, we believe, are annually lost in them; yet, while houses are protected by conductors, or insured against fire, barns are left to take care of themselves. In a single storm that passed over the Delaware river near Trenton, a few weeks since, three barns were struck and destroyed; 14 cows were lost in one, and the whole loss was several thousand dollars. None were protected, and on one only was there a trifling insurance. The reason why barns at such a season of the

year are so frequently struck, is owing to the column of heated vapor that rises from the partially fermenting mass within, which vapor is one of the best conductors for the electric matter of the cloud. After this vapor ceases to rise, barns are in no more danger than other buildings of equal elevation; and the necessity of protection, or insurance, arises from the fact that the greatest danger is at the precise time when the greatest value is accumulated in them. Common prudence demands that protection by rods should be given, or insurance against such casualties effected.

PASTURE.

From the American Farmer.

An English writer recommends to mix a few sheep and one or two colts in each pasture for horned cattle. Another says, "the following economical experiment is well known to the Dutch, that when eight cows have been in a pasture, and can no longer obtain nourishment, two horses will do very well for some days, and when nothing is left for the horses, four sheep will live upon it; this not only proceeds from their differing in their choice of plants, but from the formation of their mouths, which are not equally adapted to lay hold of the grass.—New grass, stocked very hard with sheep will unite and mat at the bottom, and form a tender and inviting herbage. In North Wiltshire, (famous for cheese) some dairymen mix sheep with cows, to prevent the pasture from becoming too luxuriant, in the proportion of about one sheep to a cow."

WHEAT-SOWING.

From the Farmers' Cabinet.

Sir,—As the time of wheat-sowing is advancing, and while the growers of that crop are suffering under the injuries inflicted during the present season, by blight in all its different varieties, I would desire to address a few words to those of our friends who would be willing to hear and to reflect upon the subject, in the hope that some means might be devised by which to escape such ravages for the future, or at least, to guard as much as possible against effects which, however variously the cause has been accounted for, have never been miscalculated or misunderstood.

That there has been a woful falling away of hopes in regard to the wheat and rye-crops of the present year, is admitted, especially on warm and light soils, where the prospect, even until after the opening of the spring, betokened better things; nay, at that season, "the crops never looked better," as was the constantly expressed opinion of travellers and the papers of the day; and the first intimation of the lurking evil was a sort of patchy appearance of the wheat, occasioned by innumerable little tufts standing up in all directions, somewhat like what are often observed on the springing of the seed after sowing, the field-mice carrying off the grain and depositing it for their winter store: and this appearance was observed in March, just after the time that all vegetation had suffered by ten days of exceedingly cold winds, after as many

days of unseasonably warm weather, which had produced a premature growth of vegetation, that had set all the old men and women throughout the country conceiving that we should suffer for this *by-and-by*, and which we have done, as well in the winter grain, as in fruits of various descriptions; all which has been attributed, and perhaps justly, to a prematurity of growth; for it has been observed that the county of Lancaster did not suffer in the same degree; their crops were less forward, owing to the land being heavier and colder and more exposed, by an undulating surface.

It has been said, by a writer in the Cabinet, and I have strong reason to agree with him in the opinion, that our climate is too hot and dry for the cultivation of wheat, which yields better, and is less liable to be affected with blight in cooler climates and on stronger soils. Now if this be the fact, and I have no doubt it is, cannot we contrive to create, artificially, a state of things which would bring us nearer the end desired; retard the progress of the plant in the early stages of its growth, and thus increase its strength, and render it less obnoxious to the sudden and extreme changes of the atmosphere, to which I believe, almost all the evils of the present remarkably changeable season are to be attributed? I think we can; and perhaps it would be the *shortest* way, first to consider how we would act if our object were to force onward a *premature growth*, and obtain the largest and most vigorous crops before the commencement of winter. Now, to accomplish this, every one would say, pulverize as much as possible the seed-bed designed for wheat, by ploughing early an oat-earth or stubble, the crop of which had been raised after corn, which had been so often worked over as to be rendered as light as an ash-heap to appearance; and, when you have obtained a particularly fine light tilth, spread it with manure from the winter cattle-yard, and, if possible, add a good coat of lime: turn all in with the plough, and, upon this *hot bed*, immediately sow your wheat early in the autumn, so as to secure, if possible, a growth of a dozen inches in height before the setting in of winter.

Now this, I believe, is the *usual* course which is pursued, with the hope of obtaining a large crop of wheat at harvest, unaffected by blight, smut, &c., and, in very favorable seasons, it is *possible* that this might be accomplished; but in nineteen cases out of twenty, I should expect that just the reverse would be the result. Then, to *retard* the growth of the crop, and enable it to become strong before winter, it is only as much as possible to reverse the course, by sowing the crop on a clover-lay after one ploughing, deep and carefully performed, with very small furrows, laying the land whole and unbroken, and as flat as possible, allowing it so to lie uncown, until after rain has fallen, and the surface has again become dry enough to work well under the harrows, perhaps for twelve or fourteen days; then, to sow the seed, two bushels per acre, harrowing it in the way the land was ploughed, and await the result.

The manure, in this arrangement, should be spread on the young clover very early in the spring as a top-dressing; and, to fit it for this purpose, it ought to have undergone fermentation; to induce this, the manure should be taken periodically from the cattle-yard during winter, and be deposited in the clover-field; the act of removing

and throwing into heap, would be the means of bringing forward such fermentation and fitting it for use. Two crops of clover-hay might be taken from the land during the summer, and in September the lay may be turned down with, in common seasons, a *certainly of escaping the blight*; the crop will not then be too big and leafy; the straw will be strong enough to support the ear, nor will it be in danger from the fly, smut, mildew, and about half-a-dozen other disorders, which, I am satisfied, all arise from the same source, namely, the *diseased state of the crop*.

In a work which I have now before me, I find the following judicious remarks on sowing wheat on lay-land; they are the experience of a very close reasoner, and an extensive cultivator of the soil, the value of which I have had frequent opportunities of testing, and can therefore recommend with the greatest confidence to the practice of all who are preparing to cultivate a wheat-crop the next year.

Bordley says, "The language of English farmers is, wheat on clover-lay should be sown on earth, that is, after one ploughing; and to conform to this doctrine I conducted this business on fifteen acres, in this manner—the clover having been cut once for hay and then pastured, but not close, the lay was turned in deep, and the furrows laid neat and close; the wheat was sown broadcast, and harrowed twice, in the same direction in which the land was ploughed; the wheat was then rolled. The crop stood well and yielded satisfactorily, but as it grew two miles from my other wheat crops, a just comparison between them was not made. The operations followed each other immediately, without any pause, but Mr. Macro's experience is against this *immediate* sowing upon ploughing in the clover-lay, and his experiments were repeated, while mine was a single instance, which, although it proved highly satisfactory in *general*, was without any pointed *particulars* relating to a much superior produce. Mr. Macro gives the following encouraging detail of his practice and success. 'From upwards of 20 years of experience, I am of opinion that the best way of sowing clover-lands with wheat, is to plough the land ten or twelve days before you sow it, that the land may have time to dry; and after rain has fallen, enough to make the land dress well, lay on the seed in September, two bushels an acre. The furrows in ploughing ought not to be more than *eight or nine* inches wide and less than that is better, if the plough will turn them well. I am at a loss to account for the wheat thriving better on lands that have been ploughed for some time before the seed is sown, than on *fresh ploughed lands*, which work better, and constitute a better bed for the reception of the grain; but I have often tried both ways on the same lands, and have *always* found the former answer the best.

"Now, I conjecture that the clover plants being buried, and the wheat sown at the same time, they both ferment and run into heat at the same moment; the germ then shoots, and the roots are extremely delicate and tender for some days, during which the buried herbage obtains its highest degree of heat, which, added to the internal heat of the germ, may, although *only slightly*, check, and a little injure the delicate shoot of the wheat; in sprouting barley for making malt, a little ex-

cess of heat in the bed checks, and a little more stops the sprouting or growth of the spears.*

"But both the above modes of sowing wheat on clover-lay *after one ploughing*, give crops *superior to those raised on fallows*; and farmers can easily try both, for determining which to prefer—that is, as well in the *immediate* sowing on ploughing in the clover, as in the method of sowing not until ten or fourteen days after; both modes are excellent. I should say, in letting the soil rest ten or fourteen days, an opening is given to heavy rains, consolidating and leaving it in an inferior state for receiving the seed; and if rain falls after burying the clover and before sowing the wheat, it may sometimes be necessary to wait for the ground to become *only moist*, rather than to sow when it is wet and heavy; but if the clover is ploughed when the land is dry, he may choose to wait for rain before he sows, although, for this reason alone, he need not wait. I have found it quite safe to sow during a drought, on clover once ploughed, and when the soil is very dry, but not when a light rain has fallen on very dry land; in the former case, the seed is safe until rain falls, which is usually in plenty after a drought, for then the seed grows quickly up—but in the other case, it is only slightly damped and swells, but the moisture is so soon evaporated as to leave the seed to dry-rot and perish; it is probable that Mr. Macro's was a light soil, and not liable to be hardened by ten or fourteen days' exposure before sowing, as, on a rain, strong wheat-land would: but

* This may be a very specious mode of arguing, but to my mind it is all wide of the mark. To me it is only necessary to suppose that the newly turned-up land, on subsiding—as it must do to a very considerable extent, when operated upon by the *pressure of the atmosphere*, and which would be increased by the internal heat mentioned above—acts very injuriously on these delicate shoots of the wheat, by compressing and dragging them down in its folds; and it might easily be supposed that its future growth would be very much injured thereby; "doubling them up" as an old friend describes it, "and crippling them in their youth;" and I have no doubt that many of them are broken and destroyed by these means.

There is a district in the Isle of Wight (that garden of England, as it is termed, where wheat is grown in one year, sufficient for the support of the inhabitants seven—so says the history) surrounding the village of Niton, where, if wheat is sown immediately after ploughing the land, the crop is sure to be destroyed by what is called the *root-rot*, occasioned by the subsidence of the soil, which falling away from the plants, leaves them exposed to the winter's frost, by which they are lifted out of the earth, and so they perish: the farmers, therefore, after ploughing their land, leave it unsown until, perhaps, it becomes covered with seed-weeds, upon which, however, they harrow in the seed, with the expectation of reaping a full crop. Some of your readers from that part of the world may have it in their power to endorse the truth of what is here stated; they will smile at the idea that "lands, if left unsown for ten or fourteen days after ploughing, will become too consolidated, and be in an inferior state for receiving the seed!" Wheat requires a consolidated seed-bed: and it is the custom on the hills of Wiltshire (England) to delay the time of wheat-sowing (which, however, always takes place *before harvest*) until a fall of rain, in the midst of which the seed is sown, and, instead of being harrowed in, it is trodden by flocks of sheep, and sometimes cattle also, until the land has the appearance of a *mortar heap*! they then expect a crop.

farmer Kliyogg, the Swiss, says, that *wheat* shoots strongest when there is an interval between the time of ploughing and sowing, but that *barley* is most vegetative when sown immediately after the plough.* One of my neighbors, intending to sow wheat on clover-lay, ploughed up the clover a week or two before seeding-time, and then gave it a second ploughing across, and sowed wheat upon it! Vast numbers of the roots of the clover were turned up, and were left standing erect above ground all over the field! Here was unnecessary labor, a useless and even injurious ploughing, by which the manure from those substantial roots, and a good part of the green crop, was lost to the crop of wheat.

"Mr. Singleton of Talbot, a gentleman entirely to be depended upon, says, while walking in his wheat-field, he was surprised to find that the crop was much superior on the worst part of the field, *where the soil was the poorest and thinnest*; it being taller, with stronger straw and larger ears. This part of the field had been in clover, which was *twice mown*, and, in August, it was broken up and sown with wheat the first of September: the other part, *the best land*, had the clover broken up in March for tobacco, but this crop being laid aside, the land was *repeatedly ploughed in the summer as a fallow*, and sown also on the first of the same September with wheat—the yield from which was fourteen bushels and a half per acre, when the part which had been twice mown and but once ploughed, gave *twenty-four bushels and a half per acre*! This difference is great, if we add the value of the clover crops, and deduct the expense of the summer ploughings, and abundantly proves the superiority of wheat on one earh."

EDMUND CROSS.

SEPARATION OF LIME FROM MAGNESIA. BY J. W. DOBEREINER.

Translated for the Journal of the Franklin Institute, from the Journ. für Praktische Chemie.

If anhydrous chloride of magnesium be treated in contact with air, oxygen is absorbed, and the chlorine abandoned. This decomposition, that is, the transformation of chloride of magnesium into magnesia, is now prompt and complete when chlorate of potash is used instead of air.

This property renders the separation of lime from magnesia very easy. Dissolve the compound of these two bodies (e. g. *delomite*, &c.) in hydrochloric acid; evaporate to dryness; heat the dried mass in a platina capsule till the acid vapors clear, and add to it, urging the heat to commencing redness, small portions of chlorate of potash, until there is no further disengagement of chlorine. The remaining mass is then composed of chloride of calcium, magnesia, and chloride of potassium, the separation of which is easily effected by treating the mixture with water, filtering the solution, precipitating the filtered liquor by carbonate of soda, &c.

* This is easily accounted for; wheat roots deep, but barley forms its roots near the surface, and subsides with the earth, without injury.

TROPICAL PRODUCTS OF THE FLORIDA ISLETS.

Extract from the Magazine of Horticulture.

July 12.—The mail schooner Hayne has arrived with your June number of the Magazine. I had hoped to see in it some extracts from my manuscript in your hands, especially under the headings of "Tropical Products of South Florida," where every thing is tropical: not merely its botany, but its zoology, is exclusively tropical phytology. Conchology, ichthyology, ornithology, are tropical subdivisions of its tropical zoology. I renew and extend my proffers of gratuitous collections at Indian Key, as long as I remain there. Mr. Howe writes to his nephew at Lowell, Mass., that he will supply barrels of products to his order, in Charleston or New York. He will also send to you by the present packet, on her return, some ripe fruit of the Manilla mulberries, of the second crop this year. You have already some berries of the first crop, in February, and you will soon have some berries of the second crop in June or July. The fig trees do bear two full crops on this coral rock; but the present crop of the Manilla mulberries is our first evidence that they may also bear two annual crops. You will perceive that the sum and substance of his desires, and of my desires, embrace the speedy emigration of agricultural settlers of virtuous habits. We mutually wish to exhibit solely the *facts*, which should excite immediate emigration of sober cultivators of profitable plants. The pre-emption laws of the United States have sufficed for the settlement of all our other new territories, and would have sufficed for the settlement of South Florida, had it not been subjected to the monopoly at Key West, ever since the exchange of national flags in 1822. Nevertheless, the first emigrants next autumn, from October to December, can probably employ themselves in the propagation of the Manilla silk mulberries and the sea-island cotton shrubs, because the cuttings of the former, and the seeds of the latter, can be obtained cheaply and abundantly. I have obtained, expressly for *gratuitous distribution*, six bushels of select seeds, of the finest sea-island cotton, and they will be planted at intervals this summer, to create an ample supply for all emigrants in the autumn or winter ensuing. I have to use the words of the north, called autumn and winter, although we have not the seasons of the north.

To illustrate how little our national senators are acquainted with the climate and soil of South Florida, I refer you to the opposition of Hon. C. Clay, of Alabama, to the congressional act for the introduction and propagation of tropical plants: "For aught he knew, the grantees might select a township valuable enough for the cultivation of sea-island cotton." Indeed! he was not aware that every acre of the calcareous earth of South Florida is the most valuable in the world, both in soil and climate, for the cultivation of sea-island cotton. He was not aware that the grantees could not select a single acre which was not valuable enough for the cultivation of sea-island cotton. He did not know that sea-island cotton was introduced into the southern states from the neighboring Bahama Islands. He does not know that on the Florida Keys it is a perennial plant of many years' duration—that Mr. Howe has plants at Duck Key from

seed sown eight or nine years ago—that at Key Vacas there is a shrub of sea-island cotton in bearing ever since 1823. He does not know, and cannot conceive, that, *for this very reason*, it cannot be profitably cultivated by large planters with numerous slaves; and that, *vice versâ*, it can be most profitably propagated by small cultivators with feeble families. Indeed, it will be a more profitable business for family occupation than even the silk mulberry, in South Florida. The principal recommendation for the production of silk in South Florida is the fact, that it can be produced at any hour when the person or his family has not any thing better to do. But silly must he be who shall pluck leaves, to feed silk-worms, during the same days that he can pluck pods of sea-island cotton.

DEATH OF DR. PERRINE.

The foregoing extract derives a melancholy interest from the fact, now known to our readers generally, that within a few days after it was written, its author fell a victim to the Seminole savages, who invaded and sacked Indian Key, and butchered such of its helpless inhabitants, of every age and sex, as could not make their escape. The lives of the wife and young daughters of Dr. Perrine were almost miraculously saved. He was shot, while speaking (in Spanish) to the Indians, and probably in the hope of diverting their attention from the escape of his more helpless family. His bones were afterwards found among the ashes of his house. With his corpse, the flames destroyed his numerous manuscripts, and his valuable botanical and other collections. Indeed, all the fruits of his patriotic and benevolent labors have perished with him, except the reputation earned with the few who have fully appreciated the value of his long-continued and unrequited exertions for the benefit of his country and the human race.

For many years, and through the prime of his life, Dr. Perrine had devoted all his energies and talents to the one dearly cherished object of extending the growth of valuable tropical plants, by gradual acclimation, into the colder temperate region of the United States. The continued progress of the savage war was the latest and greatest obstacle to the fruition of his hopes, and it forbade his even touching the designed scene of his operations, on the southern part of the mainland of Florida. In the mean time, while waiting for what seems farther off than ever, the overcoming and removal of a handful of hostile savages, by all the power of the arms and the treasure of the United States, he attempted to carry on preparatory operations by a residence at the nearest point deemed safe from the murderous attacks of the Seminoles. But ill-placed was this confidence, and most disastrous the result. Indian Key,

though separated from the main-land by 30 miles of sea, was invaded by a body of Indians, in canoes, and attacked in the sight of an American vessel, and plundered, and every house burnt, after the putting to death every person who could not escape. This was not all. The Indians kept possession of the island as long as they pleased, and long enough for them to be attacked by, and to defeat and drive back, a small military force of the United States army, armed with artillery, from an adjacent island. The horrors and disgraces of this war with a few hundred savages increase instead of diminishing, after years of duration, and after sacrifices made by this country beyond all precedent, or what would previously have been beyond all belief.

The following extract from a southern newspaper presents some of the particulars of this last act of the Florida war.

"About two o'clock, on the morning of the 7th inst., a Mr. Glass, in the employ of Mr. Houseman, happening to be up, saw boats approaching, and informed a person in the same employ, when they passed into Mr. Houseman's garden, and were satisfied that they were boats containing Indians. The Indians commenced their firing upon the houses of Mr. Houseman and Dr. Perrine; the former of whom with his family, and that of Mr. Charles Howe, succeeded in escaping to boats and crossing over to Tea Table Bay. The family of Dr. Perrine passed through a trap door into their bathing rooms, from whence they got into the turtle crawl, and by great effort removed the logs and escaped to the front of Houseman's store. They went to a boat at the wharf, which six Indians—all who remained—had partly filled, and were in the store after a farther supply. They then pushed off, and pulled with an oar, a paddle, and two poles, towards the schooner *Medium*. They were met by a boat when they had rowed a mile, and taken to the schooner.

"Mr. Motte and wife, and Mrs. Johnson, a lady seventy years of age, fled into an out-house, from whence Mrs. Motte was dragged by an Indian, and while in the act of calling on her husband, "John, save me," she was killed. Mr. Motte shared the same fate, and was scalped; and the old lady as she was dragged forth, suddenly jerking from the Indian, broke his hold and escaped under a house. Her grandchild, a daughter of Mrs. Motte, aged eleven years, was then killed with a club, and the infant strangled and thrown into the water. This was seen by Mrs. Johnson from her hiding place; but the Indians fired this building, and she was again forced to flee, and escaped to Maloney's wharf, where she secreted herself, and was finally rescued. A sturdy, a boy about eleven years of age, hid himself in the cistern under Mr. Houseman's house, and was scalded to death by the burning building heating the water. The remains of an adult skeleton were found among the ruins of Dr. Perrine's house, supposed to be the Doctor, as well as a child, thought to have been a slave of Mr. Houseman."

THE MASSACRE AT INDIAN KEY.

[After the foregoing article was ready for the press, we received from Mrs. Perrine the following account of the escape of the family of Dr. Perrine.—ED. F. R.]

From the Wayne (N. Y.) Sentinel.

Mrs. Perrine and her three children, two daughters, (young women,) and a son, about 13 years of age, survivors of the dreadful massacre at Indian Key, Florida, on the 7th of August last, arrived here on the night of the 5th instant, in comparative good health. Their intense sufferings and miraculous escape, are among the most thrilling incidents upon the annals of Indian warfare, in our country. We doubt whether, for self-possession, cool determination, and daring bravery, under such appalling circumstances, an equal can be found on the records of female heroism, in ancient or modern times. A special Providence seems to have inspired and directed them, and by its unseen power, rescued them from an awful death. The facts as we learn them from the family, are as follows:

This Key is a small island off the south-east coast of Florida, containing only about 12 acres of land, and 5 families, in all about 60 inhabitants. Around Indian Key, are a chain of keys on the north-west, extending towards the main land, the most noted of which is Maticumba. This is distant from Indian Key about one mile, and extends to within 20 miles of the peninsula or main land, being the nearest point from any of the keys in this direction. Owing to the distance from the main shore, and the known habits of the Florida Indians, during the present war—scarcely daring to venture beyond the confines of their own impenetrable swamps and fastnesses—and from the fact that a small force was stationed on one of the group—Tea Table Key—which was also made a naval depot, the idea of security was never interrupted, nor the thought or possibility of danger entertained. The inhabitants there were as careless and unconcerned as in the most profound peace. But, alas! the infuriate savages—those demons in human form—like their counter-part, the spirit of evil, choose for their victims the most unguarded—those least prepared to resist. They spring from their jungle upon the innocent and unsuspecting, like the tiger upon his prey. There is but one onset, and the bloody work is done.

In the attack upon this island, it was the plan of the Indians to strike but one blow, and make that decisive. They approached it at an unusual point, where it was deemed inaccessible.—They were about 80 in number. It was their plan to divide their force, and make a simultaneous attack upon every house on the island, and cut off at once every possibility of escape; but fortunately, their presence was detected before their hellish purpose could be executed. Two laborers of a Mr. Houseman, who for some reason were abroad, (it being about 2 o'clock in the morning,) first discovered the canoes of the savages, 17 in number, drawn up on an obscure part of the island. There could be but one explanation to this strange appearance: that was quickly apprehended by the workmen. Indians were present, and death and plunder could

be their only objects; and they were soon discovered, in their skulking attitudes, filing for the different houses—the inmates of which were all enjoying their quiet slumber—little dreaming of the impending storm that was about to burst upon them. The alarm was instantly given, and in a manner so as to frustrate, partially, the designs of the savages, and by the providence of God, a part of the devoted victims, snatched from swift destruction, were permitted to escape their intended doom. But as a full account of the bloody tragedy is intended to be given from another source, we shall confine our narrative to the part acted by the family of Doctor Perrine.

At the time of the attack, the family were sleeping in the second story of their dwelling, and the lights, for the first time in a number of nights, had been extinguished. Mrs. Perrine and her eldest daughter were still invalids, having been indisposed and confined to their rooms for some weeks previous. The first intimation of danger, was the savage war-whoop, and the discharge of rifles, accompanied by the falling of the glass, as the shots passed through the windows around them. This was an awful change in the quiet stillness of that hour; but the family at once realized their perilous situation. The danger was too near at hand to admit of a doubt—too startling and sensible to be imagined as a dream, or an illusion of the fancy.

It appears that the dwelling of Doct. Perrine was situated on the edge of the island and constructed upon a pier, so that a part of the house extended over the water. On the top was a cupola and underneath a cellar and a room used for bathing and connected with the cellar by means of a trap door. From the bathing room there was a narrow passage under the pier leading to the outer edge of the wharf, made to admit the influx of the tide to the room. The passage and room were now nearly filled with water. At the end of the passage and extending out even with the pier above, was a large turtle crawl, constructed by driving palmetto posts or piles deeply into the marl beneath.

Upon the alarm and yell of the Indians the family instantly sprang from their beds and sought concealment in this bathing room. The Doctor having conducted them hither, left them at the door, telling them that he would return and speak with the Indians, and see what he could do. He had no means of defence. His repeating rifle and pistols were useless to him, as he had no caps for either. His only hope was a parley with them, and with great deliberation he ascended again to the top of the house and called to the Indians in Spanish, (these being of that tribe known in Florida as the Spanish Indians,) and told them that he was a physician, and they must spare him. It had the desired effect for the moment. They listened to his words, gave a shout, and turned their attacks upon other dwellings in the vicinity. The Doctor then descended, drew a large seed chest over the trap-door that led to the bathing room, thinking, no doubt, by secreting his family, he should be able to manage the savages and save himself and them from destruction. He then returned to the cupola, and shortly after the attack was renewed by the Indians with a determination not to be again diverted from their purpose. Seeing that he had nothing to hope from them, his

object then appears to have been to fasten the massive trap-door by which he ascended the cupola, and prevent their access to him, or knowledge of his situation. But they burst into the house and forced their way to his retreat, and from the fiendish yells of the exulting monsters, the family suppose his horrid butchery was here completed. The savages then fired the house upon the top and commenced their search for other victims and plunder. Mrs. Perrine and family at this juncture retreated from the bathing room through the subterraneous passage leading to the turtle crawl, and sought that as the only refuge for a moment's safety. In this place, in each other's arms, the mother and three children, with scarcely their heads above the water, lay for nine long hours, still as the reigning silence of the grave, awaiting their fate. The savages for a long time were upon the planks over their heads, performing their hellish orgies and glutting over their plunder, and even hoisted a plank and looked down towards them, but as Heaven would direct, the objects of their search were undiscovered! In the mean time the house was burning to its foundations. The plank also over the turtle crawl caught fire. The smoke and heat from the burning house and other objects were becoming so intense that death from this cause seemed inevitable. Life was supported for some time by dashing water in each other's faces, to keep the air in motion, and by plastering their heads with marl from the bottom of the crawl to ward off the scorching heat. At length it became so oppressive that Henry, the young lad, could bear it no longer. His mother endeavored to prevent his screams by clasping his mouth with her hands, but he tore away from her, declaring that he preferred death by the tomahawk rather than in that terrible place. He made his escape through an aperture of the turtle crawl, but which was too small to admit the egress of the others, who were now sensible that an adventure offered the only chance of life. There was now no way of escape except by a removal of one of the deeply imbedded piles with which their retreat was constructed. This could only be done by removing the earth at the bottom which was far under water. Mrs. P. set herself about the task and accomplished it just in time to avoid the falling timbers under which they had been sheltered. There were six huge Indians at this time plundering Mr. Houseman's store a short distance from here. Near the store was a launch, or small boat drawn upon the wharf which they were filling with their spoils. Mrs. Perrine and girls approached the boat—having to wade through the water in full view a hundred yards to do so, (while the savages had returned to the store after other articles of plunder)—beckoned to them the boy, (of whose fate they had been uncertain,) who was standing close upon this den of murderers, and by their united strength and the most desperate efforts, succeeded in tearing it from its fastenings and dragging it into water of sufficient depth for it to float. They sprang in, and, with one paddle, one oar, and two poles, exerted as it were the last energies of life in widening their distance from the ill-fated shore. By the blessing of God they made their escape. They were not discovered by the Indians until beyond the reach of their deadly rifles. A pursuit was attempted, but the fortunate appearance of a schooner deterred them from persisting.

When we consider that during all this time, one of the young women was not only helpless, but had to be borne by the strength of the others, and that Mrs. Perrine, herself, was absolutely ill, the determined fortitude, the cool calculation, the great feats of strength, the daring adventure and wonderful escape from butchery and the flames, appear so striking as to almost stagger human credulity.

The destitute fugitives were taken up by a boat from the schooner *Medium*, Capt. Magee. Their situation must have been truly distressed—having been nine hours in the mud and water at the Key—and some three hours exposed, with nothing but tattered night-clothes—if by this time they even merited that name—to the burning rays of a tropical sun, they were literally wasted alive. They wish to express their grateful acknowledgments to the captain of the *Medium*, and his officers and crew, for their gentlemanly and generous conduct, upon this trying occasion. They wish also to express their deep-felt gratitude to Captain Laughlin, of the "*Flirt*." His obliging kindness, and that of his men, will long be held in remembrance by the sufferers. On board the *Santee* steamer, in which they reached St. Augustine, every kindness and attention were paid them, which their wants and destitute situation required. To Doctor McCreary and Midshipman Murray, of the naval depot—Tea Table Key—and very many gentlemen of Key West, they feel under weighty obligations for their attention and kindness. They cannot refrain from a special acknowledgment of their gratitude to Doctor Edward Worrel, of the U. S. A., who accompanied them from Cape Florida to Philadelphia, and treated them in the most praiseworthy manner. And they wish to say to their friends generally, that no pains have been spared wherever they have been, among strangers or acquaintances, to mitigate the burthen of their sufferings; and that they have reached their destination in safety, and are happy thus to acknowledge the numerous favors heaped upon them, and their gratitude to an overruling Providence, whose protecting hand so signally shielded them in the hour of trial and danger.

THE MANY-HEADED WHEAT.

The many-headed wheat is an indigenous plant of California, six heads of which were procured by Major Spering, from a man in the Osage nation of Indians, who had been trading in the Pacific Ocean. The six heads produced six hundred grains, which were planted by Mr. Pipehus Baker, of Abbeville, S. C., the production of which was ten thousand heads. The ground on which the wheat grew was measured by an accurate surveyor—the heads counted—and one head shelled out, and the grain weighed; a calculation was then made, the result of which was, the wheat produced at the rate of two hundred and thirty bushels to the acre. It was planted about the last of January, and cut on the 20th of June. The land on which it grew is poor and sandy, and was unassisted by manure.—*Wilkes County (Georgia) News*.

[From the above annunciation, the public may look out for a new humbug. It is certainly a mag-

nificent subject for one; and, if in proper hands, Grant Thorburn's, for example, might prove of great value to the seller of the seed. An adept in the business would ask a dollar a grain for this precious wheat, which produces 230 bushels to the acre, on poor, sandy and unmanured land.—
ED. FAR. REG.

ANTI-MAGNESIA.

From the Farmers' Cabinet.

I have taken the Farmers' Cabinet, from the commencement, with a desire of receiving information respecting the use of lime for agricultural purposes; and by perusing the pages thereof, I find there are various and conflicting opinions respecting its use. There are those who are of the opinion that 25 bushels to the acre are a sufficient quantity, and others that 50 to 150, or more, are not an overdose. In England, I understand, as much as 500 bushels per acre are applied, and yet I have never read of its being an over quantity. The soil and climate there may possibly have some share in preventing an injurious effect upon vegetation, but I consider the principal cause is in the quality of the lime, although I may be mistaken. Having read an article on the value of lime as a manure in the third volume of the Cabinet, continued from page 14 to 17, where it is stated that the effect of the lime in producing vegetation was as instantaneous as barn-yard manure, and superior thereto,—it put me to thinking whether the account was correct. But, considering that the limestone contained 93 per cent. of carbonate (of lime I suppose) and, of course, little or no magnesia, or other poisonous qualities, it must be something superior to the generality of lime used in this country, and, from those considerations, I concluded the account might be correct. It is a question with me, whether the lime that is the most profitable for making mortar is the most valuable for agricultural purposes; it may be that a portion of magnesia in lime is of use in making a cement, and worse than useless in agriculture, for it is injurious to the growth of vegetables.

Any person having poor worn-out land, and wishing to improve it, and being located within 10 or 15 miles of lime, I advise him to lime, it will pay therefor; but I do not mean lime containing nearly half magnesia. As an instance of the effects of lime, I will mention only one, but it is sufficient for my purpose: I, in company with another person, took lease, in the spring of 1820, for the term of ten years, of a farm containing something more than 160 acres of land, 100 acres cleared, and commenced liming; (we hauled the stones about 11 miles and burnt them on the spot) and, during that term, we put upon the farm thirteen thousand bushels of lime, and cleared, free of all expense, thirty-five hundred dollars, principally by selling grain; and changed the said farm from one of the poorest, to one of the best in the neighborhood, although during the first years (as the saying is) we hardly cleared our teeth, owing to the unproductiveness of the soil before liming. It has long been a question with me, how sulphate and carbonate of lime act on vegetables: It was formerly

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the opinion of many, that the use of sulphate in agriculture was its attracting powers; now, since the experiments of H. Davy are becoming known, the opinion is changing, and its use is that of entering into the composition of the vegetable; and it may be possible that it is of no direct use to any vegetable, but when it composes a part thereof; and carbonate may act something similarly; by heat, the water and carbonic acid are burnt or driven off, and the stone is changed into an oxide, and by the addition of water it becomes an hydrate, and then it has a powerful attraction for carbonic acid; and, after having received its portion of carbonic acid and water, in my opinion, it becomes soluble, and is taken up by the roots of vegetables and enters into their composition, for vegetables are composed principally of carbon and water. I consider the more soluble carbon there is in any soil, the more food for vegetables that soil contains.

I think I should not have put pen to paper, if I had not read in the Cabinet, for April, an instance recorded of the injurious effects of lime, from the testimony of my friend M. S. K. of Morrisville, and having been informed that there exists limestone on the canal, or nigh thereto, above New-hope, highly impregnated with magnesia, so much so, that I consider it unfit for agricultural purposes; and, thinking that the lime used by M. S. K. might possibly come from thence. I know of nothing that from a part of what we call limestone, pernicious to any soil except magnesia; but we ought to be cautious how we use lime before we know its qualities.

ANTI-MAGNESIA.

Lancaster County, 7th mo. 14, 1840.

OLD WHEAT FOR SEED.

In a recent conversation with Mr. William Skinker of Fauquier, an old and experienced farmer, he mentioned that, for experiment, he had sown a few bushels (from 4 to 10) of wheat of the previous year's crop, in each of his three last seedings, and that he had found the product of the old wheat always much better than that of the new wheat sown adjoining. Indeed, he thought the increase to be not much short of 100 per cent. He could not assign any other reason for the superiority, except that by keeping the seed wheat a year longer than usual, the imperfect grains might lose their vitality, and leave nothing to grow except those of the best quality. We think this totally insufficient to produce the manifest superiority which we are confident Mr. S. saw, whether he was or was not mistaken as to its amount. But the experiment is worth repeating, and we hope it will be repeated by as many of our readers as can conveniently obtain old seed of good wheat.

A year ago we heard stated, by a gentleman of Cumberland, a still more remarkable fact, which had been recently observed in that county. A farmer had sown a few bushels of old seed along-

side, or perhaps between, the sowing of the balance of his field with new seed. There was no difference between the adjoining parts, except as to the age of the seed. No experiment had been designed, nor was any difference expected; but the result was that, while the crop from the new seed was greatly injured by the Hessian fly, that from the old seed escaped entirely. Our informant understood that there was no doubt of the existence of this remarkable difference, in the minds of all who saw its growth, and that every effort was making to obtain old seed to sow, for experiment, for the last crop. We begged to be informed of the results of these later trials, but have heard nothing more on the subject; and thence infer that the hopes entertained have been disappointed.—
ED. FAR. REG.

CALCAREOUS EARTH FOR MANURE IN LOUDON COUNTY.

To the Editor of the Farmers' Register.

Belmont, Loudoun Co., July 29, 1840.

Through the kindness of Mr. Strachan, I send you a few specimens from a calcareous deposit found in this neighborhood. It occurs at the bridge over Goose creek, and can be traced from the bridge, east, for a distance of two miles on the side of the public road, and north of the road to the Potomac—in ravines and on the banks of the streams flowing into the Potomac. Mr. Wilson, of this place, a plain sensible farmer, on whose land it is found in considerable quantity, has submitted its fertilizing properties to the test of all tests—actual experiment. A wheat field was spread with this earth last fall—he thinks with decided success. He also showed me a field in pasture, a portion of which was treated in the same manner. It was staked out in two lots, leaving an intermediate space, on which none of the earth was laid. There is a perceptible difference in favor of the calcareous earth. Though I have entire confidence in Mr. W.'s statement, yet, as I did not see either of the fields before the experiment, of course I can say but little from my own observation of these experiments.

Of the three specimens sent, No. 1. is of the rock from which the calcareous matter is derived. It is, as you will perceive, a trap or hornblende rock, which is the underlying rock of this place. The upper surface of this rock is disintegrated frequently to a depth of four feet, and in that state presents the appearance of No. 2. This is the earth used in the experiments just mentioned. The proportion of lime is extremely variable, even in specimens taken from nearly the same spot—I have found from 5 to 50 per cent. It is generally found near the surface and interspersed with nodules, such as No. 3. These nodules are evidently formed by concretion from the lime set free during the disintegration of the rock. They are not at all friable, and, I suppose, would require grinding or burning before they could enhance the fertilizing property of the earth. They constitute, however, the richest portion of the deposit. A

basket-full of these nodules sent me last winter, gave 30 to 75 per cent. of carbonate of lime.

I am not certain that the value of this deposit as a manure is sufficient to justify its being used at any considerable expense. As a geological formation, it is full of interest. Hornblende rock is known to contain lime, but I have never seen the proportion of lime so great.

Should you know of any instances in which a similar deposit has been used as a manure, an account of the manner of treating it would be highly useful to those interested here.

Truly and respectfully yours, &c.

M. TUOMEY.

REMARKS ON THE FOREGOING COMMUNICATION. EDITORIAL PUFF DIRECT.

The discovery of the deposit described above is a more interesting fact than our friend, who has investigated it, was aware of, inasmuch as the like calcareous products have been before found in other and remote localities, thus showing the formation to be extensive, and probably of great agricultural value, instead of presenting a singular and isolated fact. In the first number of the first volume of the Farmers' Register is a full and minute description, given by Dr. W. S. Morton, the first discoverer, of a like calcareous earth, and of a region of valuable natural soil, deriving its peculiar qualities from this earth, in Prince Edward county, and extending much beyond the limits of that county. Lately, specimens of stony nodules, manifestly the same as these, were sent to us for examination from the coal region of Chesterfield. The appearance of these nodules is so peculiar, and the specimens from all these remote localities so precisely alike, that they clearly show a common origin and formation. Immediately after receiving the foregoing letter, we sent to its writer a copy of Dr. Morton's former communication; and from the minute description there given, even without the opportunity of comparing specimens, as we had, Mr. Tuomey was satisfied of the identical kind and origin of the two deposits. In his answer, (of Sept. 18th,) he says—

"The deposit described by your correspondent must be similar to this—the 'black rock' of which he speaks, being, I suppose, hornblende. When these nodules were brought to me, I concluded that the deposit in which they were found was connected with the celebrated calcareous breccia, (Potomac marble) of the Potomac, which terminates after crossing the Potomac about 5 miles from this; but on examination, I can find no such connexion, the deposit being invariably associated with the hornblende rock of which I sent you a specimen."

For more full information, we would have here republished (from vol. i.) the interesting communication from Dr. Morton, together with the accompanying statements of analyses of the specimens, but for the length of the pieces, and also

because it would violate a general rule, which both propriety, and justice to our old subscribers, make it necessary to observe. We frequently have inquiries made which have already been fully answered by articles in some of the earlier volumes of this work, and which could not be again more satisfactorily answered than by a republication of the same. Such republications also would be as interesting and useful as any thing we could furnish to those who had never seen them before; and the plan would be a great convenience to the publisher. Nevertheless, those who would be the gainers by such a procedure must see that it would be unjust thus to present again to all of our oldest subscribers, who have paid for the Farmers' Register from its commencement, articles which they had before received and paid for. Yet, in declining to make such republications for the benefit of new subscribers, we have no other alternative course than to refer them to the older volumes containing the information, and which course has much the appearance of being used as an indirect request to them to buy the volumes so referred to. And the fear of this construction being placed, has rendered it (in that respect) disagreeable to us to refer to old articles, or to recommend their perusal to later readers. But having been thus drawn to make this explanation and apology, we will dare to go farther, and say, once for all, that every subscriber to the present volume of the Farmers' Register, who values the work, ought, for his own interest's sake, to buy the earlier volumes, and complete his set. For the reasons and because of the procedure stated above, each volume contains matters different from all the others, and without which all the others would be very deficient. And we will presume further to say, that there is not one of the volumes, the perusal of which would not be worth to any intelligent and improving cultivator more than the price of the entire series. Of the first volume, a second edition of 500 copies has lately been printed, at a cost (because of the small number and the still smaller demand) far exceeding the price at which the volumes are sold. Of other earlier volumes, there remain only enough to furnish about 150 complete sets; and, with the experience of the past, we have no expectation of being induced hereafter to reprint any more. Therefore, all later subscribers who desire to complete their sets, should hasten to do so while it yet can be done.—ED. F. R.

WORMS IN PEACH TREES.

From the Boston Cultivator.

Mr. Haskell says he has taken the peach worm from the roots of his trees, and confined him under

a glass until he turned to an insect. He feels confident that the worm which comes from the nits of this season, turns to an insect during the next—therefore if we kill the eggs or the nits at this season of the year, when they will be found on the bark of the tree, we need be at no trouble to dig out the worms from the body of it.

One mode of killing these eggs is to pour scalding water on to the body of the tree—and if it is two inches in diameter we need not fear to turn on a quart or two. Strong ashes put close to the body will kill the eggs. Strong lime applied with a swab is as good as any thing—but we should never cut out these worms with a knife. Let them turn to flies and we can then destroy their progeny in the egg.

Mr. H. says the insects that come from this worm of the peach tree resemble the mud wasp.

AID OF THE LEGISLATURE AND OF AGRICULTURAL SOCIETIES REQUIRED TO IMPROVE THE CONDITION OF POOR CULTIVATORS.

To the Editor of the Farmers' Register.

Will you not revive the proposal to establish a board of agriculture? Could we not have, as in New York, a state agricultural society? And if so, might not the plan succeed well of holding its meetings in different portions of the state—going regularly through from year to year, until the circuit of the whole should be completed?

And when the presidential election is over, the multicautious fever having passed away, and —* become as plenty as blackberries, would it not be a favorable time again to press upon that class of our population who ought to be silk growers, the expediency of turning their attention to it? No one in this state, so far as I know, has given that subject half the attention you have, or done half so much to awaken our people to their true interest, as connected with this important branch of domestic industry. But, unfortunately, the Farmers' Register does not reach them, nor indeed any other paper from which they might derive information so important to them. Few of its subscribers, I apprehend, put it into the hands of their poorer neighbors, who are unable themselves to subscribe for it, or impart to them the valuable information it contains.

As to the production of silk, it seems to me that its greatest value, as well in a moral as pecuniary point of view, will be found in the employment of those, both old and young, who now are consumers and idlers only—not producers. But with the poorer class of our people, there exist difficulties, insurmountable by themselves alone, which might be removed by public-spirited individuals who have wealth and leisure, or by the state. Do not start at the reference to her—I am not now, nor was I ever a tariff man. But I cannot con-

* This word in the manuscript was entirely illegible, and its shape did not admit of even a plausible guess, which of course it is the editor's duty to hazard in all such cases, and afterwards to bear all the blame for guessing wrong. Therefore a blank is left, which the reader may fill, according to his political or other inclinations, with either the word "money," or "credit," or "paper," or "morus."—ED. F. R.

ceive how the aid which the state might afford, and ought to give, to bring into action the dormant industry of her own people, can fairly be placed upon the same ground with the national tariff policy.

The difficulties I have referred to, have no doubt fallen under your own observation. Take for example the population around and within reach of the cities and towns—many of them are to be seen either in the markets with melons or scanty supplies of ill-cultivated vegetables, or driving about a small load of wood for sale. On inquiry it will generally be found that nine-tenths of them are small landholders, have families, and, with the usual fortune of the cabin, pretty large ones too. In regard to the venders of wood, that the father of the family derives their sole support of his family (and a scanty one it is) from the wood cart, that his father, and grand-father, if he had one, did the same thing, having neither in the present or past generation the remotest idea of improved agriculture. That each one has at home a larger or smaller number of half grown boys and girls; three or four of whom may occasionally be seen accompanying the cart to town. The necessities of the fathers leave the children to grow up in ignorance, often in idleness; he has not the means to educate them, nor time to attend to their habits or morals. How much labor is lost in these cases which might be most profitably and happily employed in producing silk—how much idleness and vice are left to keep out industry and virtue, by leaving these poor people to drudge through life, generation after generation, without one effort to help them! Talk to the father—tell him of the advantages he might derive by directing his attention and employing his children in silk growing, which in a few months will produce him more than years of his present drudgery, at the same time that it will render them all more comfortable, and enable him to impart to his children the blessings of education—and in a very large majority of cases he will be found willing and anxious to make the trial. But the daily bread of his family which he has got all his life by the market or the wood cart, where is that to come from while he is learning to produce silk and encountering the first difficulties of a new occupation? And the question is a natural and reasonable one. But if a helping hand be held out to him; if he can be sure of his subsistence until he can rely upon the new occupation for it; every industrious and temperate man of them will readily become a silk grower. How strong an appeal is here, to the wealth and intelligence which every county and town of the state contains! Could the wealth and the time of those who have both at command, be more nobly employed than in such a cause as this?

I have mentioned one description only of our people; but there are thousands of the same description, though subsisting differently according to circumstances, all over the state; and it is incumbent upon those who are in better circumstances, to do what they can to improve their condition. In time of war, if the man of wealth be drafted for service, he can hire a substitute; but if the lot falls upon his poorer neighbor, whose family depends upon his labor for support, and on his presence for protection, he must shoulder his musket and take the field, for he has no means to hire a substitute. There have been many such cases;

they are inseparable from the various circumstances in life; and I do not speak of them in the detestable spirit which seeks, for unworthy purposes, to array the poor against the rich, as you will do me the justice to believe. The hardships incident to poverty claim, and they have, the sympathies of those in comfortable circumstances. But this is not enough. Cannot and ought not the wealth and intelligence of Virginia to associate for the purpose of encouraging the production of silk by the poorer class of our people? And how can this be best effected? Is it not practicable to form a society in every county east of the mountains, who might raise a fund by general subscription according to the ability of its individual members, to be applied not as a gratuity, but as a premium to the industrious poor, upon their labors in the silk culture. To the collection and diffusion among them of the requisite information in regard to the whole process of feeding the worm, reeling and preparing sewing silk, &c.; in short, every thing which might be necessary to enable them to derive the largest profit upon their industry. If but one family in a neighborhood could be got successfully under way, others would soon follow, until in all probability thousands of females and children who are now unable to earn a subsistence, would be rendered comfortable and happy.

I say nothing of the useless portion of our colored population, some of whom are to be found upon almost every farm in Virginia. If their owners are content to maintain them in idleness, that is their affair; and though considerable profit might no doubt be drawn from the employment of elderly and young slaves in this business, the important benefits of employing *them*, would be nothing in comparison with that which would flow from a general diffusion of this branch of industry among the class of our white population I have mentioned.

While in Philadelphia, about 12 months ago, a gentleman of that place, who has travelled all over Europe, is a man of accurate observation and extensive information, remarked to me in substance, "that Virginia ought to be a great silk growing state. You have," said he, "greatly the advantage, especially as regards climate and labor; yet the northern people will beat you at it, under all the disadvantages of a worse climate and dear labor; and so far from employing that portion of your slaves who now do nothing, in this most profitable branch of industry, I doubt not that in two or three years the Yankers will be going over your state, and wherever a plantation of mulberries is to be found, feeding the silk-worm in shares with the proprietors, by means of the same useless negroes that you ought to employ in it yourselves. And it will be better for you than the present state of things, though not so well as if you would do it for yourselves." He remarked that the speculation in *morus mulicaulis* was at an end; that with many, neglect and indifference to the proper use of the plant, would for a while succeed it; but that depressing causes would after a while disappear, and ours become a silk growing country—the most important results of which would consist in the establishment of great companies and cocoeneries, but in its more general diffusion as a branch of household industry.

I wish I could give you his observations in full,

but as I cannot, and you have by this time no doubt found this long scrawl a sufficient bore, I will not trouble you farther, than to apologize for writing to you (I can scarce say why) upon a subject with which you are so much better acquainted than any one I know.

INCREASING DEMAND FOR CRANBERRIES.

From the Yankee Farmer.

One company sold last year *six thousand* dollars worth of cranberries for one market, New Orleans. We are informed that this article now sells in this market for three times as much as it did *fifteen* years ago. There is a great call for cranberries for the southern market, and they are excellent for ship stores. The cranberry is one of the most wholesome and palatable of fruits, and it can easily be preserved for a long time.

Many persons have good advantages for the production of the cranberry or for increasing their crops by good management and cultivation. Four acres of land, conveniently situated for the advantages of this market, were offered for 60 dollars, four or five years since; lately five hundred dollars were offered for this land. The increased value is principally owing to its producing cranberries. The crop sold last year for 400 dollars.

LIME AND MARSH MUD.

From the American Farmer.

A gentleman distinguished for good and great qualities, tells us, that on a sandy soil, he has found lime a powerful fertilizer. A poor field put in corn—yield 10 bushels—followed by oats—crop light—succeeded by wheat—yield not more than the seed—limed, and next crop gave 40 bushels to the acre. Experience has taught him the great value of *marsh mud*, especially when used in combination with a small quantity of lime. Keeps a small force specially assigned to the collection of marsh mud, weeds, leaves, mould from the woods, &c., and is amply compensated for it—cannot too highly recommend the use of marsh mud—has covered several acres with *brushwood*. The fertilizing effect very obvious, and thinks poor land may be reclaimed by a covering of brushwood, very speedily, and with great economy as to the labor and the results—is very careful to have all brush not large enough for firewood, even the pruning of his orchards, reserved to be spread upon the most exhausted portions of his land.

EXPERIMENT OF SILK-WORMS REARED IN THE OPEN AIR.

[The early part of the following experiment was stated in our notices of the Cape Fear country, at page 264, of this volume; and we are gratified thus to learn the results. They are fully as good as could have been expected, of worms exposed to all kinds of weather, independent of other disadvantages. This experiment is enough to show that success in rearing silk-worms, unsheltered, and left to feed themselves, cannot be hoped for.

Still, if only in deterring from similar attempts, (of which there have already been many made in different forms,) this report will be useful, as well as interesting. Much good would be done to agriculture if many other persons would, as Dr. McRee has done in this case, report the results of unsuccessful as freely as of successful experiments. The one class of reports might save readers and experimenters from as many farming sins of *commission*, as the other class of reports ought to present of sins of *omission*.

As the few survivors of this brood of worms were of course free from all the diseases caused by confinement, and its accompaniments, it seems most probable, as Dr. McRee thinks, that their eggs will produce a more than usually vigorous stock of worms. That question will form for him a subject for another interesting experiment next season, to be used in his cocoonery.—ED. F. R.]

To the Editor of the Farmers' Register.

Wilmington, N. C., Sept., 1840.

You expressed some interest when here last spring, in a rude experiment I was conducting, to test the hardiness of the silk-worm, and especially its capacity to endure cold and wet weather, with the various alternations of the two, to which our climate is so subject at that season. No accurate results were obtained, for want of a knowledge of the exact number of eggs which were subjected to the experiment; but some general facts were elicited not altogether uninteresting or useless. You know the eggs were exposed on the branches of the mulberry trees early in March, and, as well as I could ascertain, most of them hatched out and immediately commenced eating the *multicaulis* leaves; at this time we had weather so cool as often to produce a white frost at night, and, as well as I could judge, without any prejudicial effect upon the *larvæ*. Severe winds were also common, and, in the last week of March, we had a snow-storm of some severity, the snow whitening the ground, but not remaining over a day on the exposed surface of the ground. All these vicissitudes of weather, with frequent drenching showers of rain, the greater part of the worms seemed to withstand without any apparent injury; and although there was a daily loss from various casualties, I cannot say that I could fairly attribute a greater part to the weather than to these other causes. These other causes alluded to, were the depredation of ants—perhaps birds—the worms falling on the ground and feeding on grass, thistles, &c.; for when detached from the leaf and on the ground, they seemed to lack instinct to direct them again to the natural and wholesome food, but seized upon the nearest green herb, (I thought) with perfect indifference as to its character, and as they could not thrive on such fare, they gradually wasted away and died. Many were lost through a most singular defect of instinct; for they would eat away the leaves over their heads till their attachment to the parent stock would become too feeble to sustain them, and they would drop on the ground and perish. I do not mean that they would cut off the petiole of the leaf, but would cut it up into shreds and hang on to the dependent

fragments till their weight would break them off and they would be precipitated to the ground. Maugre all these casualties, and the great exposures to which they were subjected, one hundred spun cocoons, not in the usual time, but occupying, I think, two or three weeks more than the time required when fed under shelter with gathered leaves; nor did they spin as good cocoons as under ordinary circumstances, many of them being thinner than usual. After the first few had spun, finding that they fell on the ground and would spin their cocoons on the fallen leaves and among the grass, I removed them into the house and suffered them to spin there. I think it not improbable that the eggs hatched from these cocoons may produce a hardier race of worms than those raised in the usual way. If I knew how to get them to you, I would be glad to send you half. I will avail myself of the first opportunity of doing so; that you may try them. I did not finish my coconery this season in time to operate—but intend commencing operations next spring.

JAMES F. McREE.

CUTTING DOWN AND STACKING CORN.

To the Editor of the Farmers' Register.

Washington Co., Ala., Aug. 19, 1840.

This season I have given the plan often suggested of saving corn, viz., by cutting down at a certain stage of ripeness, and curing in small stacks, a full and fair trial; and I am still more astonished that any other plan has ever been pursued. The astonishing difference in the labor required to save a field of corn, to say nothing about "ruffage," manure, peas planted among the corn, &c. The singular capacity of this country to produce a pea crop makes it a most important one. I never cut a stalk unless the shuck is yellow. I find no trouble in going over my ground the second time. By drilling my corn I have no nubbins. Just as the peas are beginning to grow off, the corn is in the stack. By the way of saving all and losing none, I embraced in all my fields on all sides a portion of wood land; this strip while I am making the crop grows up into a fine pasture, and I have it in the fall to put in my cattle, horses, mules, &c., and saves the crib awhile longer. In the edge of this strip I stack my corn until I haul. The state of the peas enables the wagon to straddle the rows, and no destruction of that valuable crop. If I plant pumpkins with the corn, I select small fields from the centre of which I can afford to carry in every direction the cut-down corn—the vines remain safe. As regards this mode of saving corn crop Mr. Buel will be found sound.

MARLING COMBINED WITH VEGETABLE MANURES.

To the Editor of the Farmers' Register.

Nansemond, Va., Aug. 15, 1840.

As you are anxious to obtain all the practical information you can on the subject of marl and calcareous manure, I have concluded to inform you of what a gentleman informed me of the use that he had made of marl and woods' litter on a very poor sandy piece of land, and what I saw of the crop of corn now growing on the same land.

He said a few years past the same lot of land, containing some three or four acres, would scarcely give him any thing for his labor. He concluded to try marl and woods' trash, to see if any thing could be done with it; so he put on from 150 to 200 bushels of marl per acre—the marl he thought very good, though he knew nothing about its precise strength. A short time after the above information I saw the crop of corn, which, to my astonishment, from the appearance of such poor sandy land, was very good, it being green and healthy from bottom to top, and having fine large ears, which I think is the best symptom of a good crop. He also showed me another lot that was much better. I asked if that was the effect of marl alone, he said it was combined with stable and farm pen manure. I should not be surprised if the latter piece should produce from 30 to 35 bushels of corn per acre. I saw another gentleman's farm not marled, not more than a mile from the above, that will not produce 10 nor perhaps 5 bushels per acre this year.

A. Z.

MARYLAND STATE AGRICULTURAL SOCIETY.

From the American Farmer.

The first annual fair of this society, took place under the direction of the trustees, agreeably to notice, on the 16th inst., which was considered the best exhibition of stock ever exhibited in Maryland. A large number of farmers presented themselves and became members of the society, many of whom brought with them fine specimens of stock of the various improved breeds. The exhibition of short horn Durham and Devon stock was particularly fine, for which the society were indebted to their owners: amongst whom were Messrs. J. S. Skinner, Richard Caton, John Mercer, George Law, W. Van Bibber, Charles Carroll, A. B. Kyle, Wm. Goll, J. P. E. Stanley, Edmund Gray, Wm. Hughes, Frazier, and Drs. Stockett and Thomas, &c. That of horses was more limited. There were, however, several fine animals exhibited of stock. In the list of mules there was a very fine team, exhibited by Mr. Goll. Among the sheep exhibited, it was gratifying to find a fine sample from the celebrated flocks of Mr. Barney, of Delaware, of the Bakewell breed. It was much to be regretted, that a lot of sheep of the Southdown breed, belonging to Gen. Emory, arrived only at the close of the exhibition of the day, in consequence of unavoidable detention on the bay, as they were an admirable specimen of that highly valued breed. The fine flock of Southdowns of Dr. Thomas were also, in consequence of breaking away, prevented from being present. There was a fine exhibition of hogs of the Irish, Berkshire, and Ulster breeds, from the pens of Messrs. George Law, J. P. E. Stanley, J. S. Skinner, and Dr. R. Dorsey, which did great credit to their owners. A great, as well as a very interesting variety of implements of husbandry, was also exhibited, which will be noticed in the reports of the committees on the same.

Among other proceedings of the society, the following officers were appointed for the ensuing year, viz:

Gen. Thomas Emory, of Queen Ann's County, President; Col. John Mercer, of Anne Arundel

County, and Anthony Kimmell, of Frederick County, Vice Presidents; and Col. B. U. Campbell, Secretary and Treasurer. The Society resolved, to hold their next annual Fair on the third Thursday in October, 1841, an earlier period being found to conflict with the business of farmers and planters. It was to be regretted that so few of their agricultural friends made their appearance from the Eastern Shore on this occasion, and also that an engagement of a political character debarred many from the western counties from attending. The trustees, however, have every reason to believe, that at their next annual Fair, which it is contemplated to continue for three days, there will be such an acquisition to the present number of the society, as will ensure its establishment upon a most respectable and permanent basis.

THE EXECUTIVE COMMITTEE.

To JOHN S. WILLIAMS, Esq.

Trustee of the M. Ag. Soc., charged with the superintendence of implements of husbandry:

Sir—The undersigned committee, to whom was submitted the several articles of husbandry and farming implements for their inspection and recommendation, do most respectfully report, that they have examined those submitted, and have to report that time will not allow them to make as elaborate a report as they would desire, and were they to make at this time a discrimination among the many articles, it would be an invidious distinction. They, however, take pleasure in reporting that the following agricultural implements, which so greatly relieve manual labor, have met their cordial approbation; and they do recommend the following among the many submitted which they have inspected, as worthy of public patronage.

No. 1. The Corn Planter and Seed Mill; Post Auger, and model of a Mowing and Reaping Machine, exhibited by Mr. George Page.

No. 2. The Ploughs, Straw Cutter, Root Cutter, Corn Shellers, Horse Power, Corn Crusher, Fanning Mill, Raising Machine, Garden Hand Plough and Churn, exhibited by R. Sinclair, jr. and Co.

No. 3. The Ploughs, Fanning Mill, Straw Cutter, Thrashing Machine, Cultivators, exhibited by J. S. Eastman.

No. 4. The Ploughs, Cultivators, Fanning Mill, Root Cutter and Straw Cutter, exhibited by John T. Durdin, and Co.

No. 5. The two Reaping Machines, exhibited by Mr. Hussey.

No. 6. The Plough exhibited by Mr. Tinkler.

No. 7. The Plough exhibited by Larkin L. Moore.

No. 8. The Washing Machine, exhibited by Mr. Scott.

The above is submitted by

JOHN P. E. STANLEY, } Committee.
ANTHONY KIMMELL, }
T. THOMAS, Sec'y.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

The fiscal year which terminates with this month will exhibit an export of domestic products exceeding in quantity, if not in value, that of any preceding one. The crop of cotton reaches nearly

if not quite to 2,160,000 bales, of which 1,850,000 bales have been exported to foreign countries, and only 55,000 bales remain in our home markets.

The quantity of tobacco inspected in Virginia, Maryland, and New Orleans, is about 130,000 hhds. of which a moderate, but unascertained stock remains in the country.

Of flour and grain we will not attempt to estimate the product of the past year, and the export of the present one.

While the exports of the country have been thus unusually great, the import, on the contrary, is small, as the finances of the government will probably show. The prices of most of our commodities have been low, on both sides the Atlantic, and bid fair to continue so; but these low prices increase the consumption, and thus produce some beneficial effect.

Reports from the cotton-growing states might induce a belief that the devastation by caterpillars, &c. was such as to reduce the crop one third or one fourth; but as such statements are made every season, there is great want of faith in them, though they are sometimes realized.

As respects the wheat crop in this part of the country, the assertions of deficiency are realized. Already the millers in Petersburg find the supply inadequate to their moderate demands, while the prices they pay are higher than those quoted in Baltimore and Philadelphia.

The weather for a month past has been favorable to the maturing of the tobacco crop, which, although less than the last, will be a full average one. The present quotations are, for tobacco, \$4 to \$10, wheat, \$1 to \$1 15, flour, \$5½, cotton, 7½ to 9½, corn, 45 to 50 cents, bacon, 12½ cents.

There is every prospect of a resumption of specie payments by the banks, in January next. Exchange on New York, 3 to 3½; on London, 9½ to 10. X.

Sept. 29, 1840.

ARTIFICIAL GRASSES, &c.

From the Memoirs of the "Society of Virginia for Promoting Agriculture."

Gloucester county, 19th June, 1819.

Dear sir—I am highly gratified by the late meeting of the Agricultural Society at Richmond; their proceedings and the light thrown on the subject, give a lively hope that the land of our fathers may yet revive and flourish. Invited as we are, by the president and yourself, I am induced, however awkward on paper I may appear, to offer my feeble aid to promote so desirable, so great an object. I am, indeed, a very old planter, but certainly a young farmer—a few years only have passed, since my mind comprehended any thing like improvement on a scale sufficiently large to be useful. A publication a few years since, by Col. Taylor, entitled *Arator*, and some acquaintance with him, (who, I think, deserves well of his country,) induced me to adopt a system, the effects of which are now strikingly beneficial; nearly the whole of the farm on which I live, containing about 800 acres for cultivation, is sown with artificial grasses, except about 200 acres in Indian corn, which prepares it for small grain and grass; and I have the pleasure to find my neighbors beginning also to be highly impress-

ed with the utility of artificial grass, and some have sown largely and are experiencing its advantages. It is easy to talk of experiments, and indeed, to make them; but nothing more fallacious and mischievous, when made without judgment or without care, and denounced without a fair trial.

With respect to artificial grasses, I believe all the different kinds generally spoken of, are good. I have sown clover, timothy, herds-grass, orchard-grass, and meadow-oat, or, as it is frequently called, Peruvian-grass; but have thought that clover and timothy suited me best; different soils and situations may make some other kinds of more utility. Where circumstances will permit, the mode practised by myself to procure seed, certainly has succeeded well. I generally make from 50 to 60 tons of timothy and clover hay, mixed, and by thrashing a sufficient part, (always selecting that best mixed, I obtained seed enough to sow two hundred acres annually. I find, that notwithstanding the clover is rather dry before the timothy is fit to cut, it is very good when put up with timothy slightly cured; and always a

large proportion of the seed of the latter is sufficiently matured to answer the purpose.

When I had the pleasure to be with you some years since, at the Warm Springs, you spoke much in favor of deep ploughing; I differed in opinion—and you know that we old planters are rather bigoted, and often obstinate. It however made an impression on my mind, and produced frequent experiments, until at length, from believing that very little land would bear it, there is hardly any that would not be improved by it.

It may be useful to draw the attention of our farmers to the properties of white wash, or common lime and water, when applied to the interior of granaries. I have applied it freely to mine for ten or twelve years, and it has freed them from the weevil, and other noxious insects with which they were infested, and does, I have no doubt, in some measure, preserve the wood. I am, sir, with esteem, respectfully yours,
PHILIP TABB.

P. S. If you think the above contains any useful information, be pleased to communicate it in such manner as you may think proper.

Col. WILSON C. NICHOLAS, *Richmond.*

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ROTATION OF CROPS.

By W. C. Nicholas, esq., Vice President of the Society.

From the Memoirs of the "Society of Virginia for Promoting Agriculture."

Of all agricultural subjects, this perhaps is the most important, and to a Virginian, the most difficult. Experience affords us but little light upon the subject. The practice in Virginia, heretofore, has been to cultivate our lands more with a view to immediate profit, than with any regard to the future. All the various soils in the country eastward of the mountains, have been used in the same way, and the same crops have been cultivated by all, without regard to the fitness of the soil, or to the situation of the farm. Every thing that could be drawn from it has been eagerly taken, without giving any thing in return, by ameliorating crops, manure, or even rest. The lands have either borne, in succession, exhausting crops, or it has been as much or more injured by improper use of it in pasture, as it is falsely called.

In fixing on a rotation, a farmer should ascertain what crops are best suited to his farm, and in what succession such crops ought to follow each other, so as to make the greatest possible profit, consistently; not only with keeping his land in good heart, but in an improving condition. "A judicious rotation of crops is the ground-work of general improvement. If a judicious system be adopted and persevered in, it cannot fail. No mode of execution can make up for a defective one. The same crops which under one system would be unprofitable and injurious to the land, under another rotation, with intervening ameliorating crops, might not only be profitable, but might promote its fertility." What I shall suggest to the society upon this subject, will be the result of my own experience and observations, assisted by all that I have been able to derive from the English and Scotch writers—making the necessary allowance for difference of climate, soil and products. I have, without scruple, availed myself of their suggestions, whenever they appeared rational, and more particularly, when they were founded upon facts properly vouched for. In speaking of the agriculture of Great Britain, I cannot deny myself the satisfaction of expressing my warmest admiration of the exalted merit and patriotism of the distinguished men of that country, who have, by devoting their talents, time and money, to agricultural pursuits, brought that most useful art to a perfection unknown to their ancestors, or to the people of any other country. The Duke of Bedford, Mr. Young, Lord Kames, Mr. Anderson, Sir John Sinclair, Mr. Coke, Lord Somerville, and others, may have less splendor attached to their characters, but I have little doubt, that they have been more usefully employed than Mr. Pitt, Lord Castlereagh, the Duke of Wellington, or Lord Nelson. I trust the people of Virginia will not be less attentive to the improvement of a country so deservedly dear to them.

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I will consider, first, the principles on which rotations ought to be arranged; next, the various sorts of rotations which have been adopted in Virginia, for different periods of two, three, four, five, six or seven years; and lastly, any miscellaneous particulars connected with this branch of inquiry.

It is not believed that the same land, without some interval, will continue to yield the same plant to advantage; there may be some exceptions, but they can only occur where the land is the richest alluvion soil, or is frequently and heavily manured. A farmer should, therefore, avoid frequent repetitions of the same articles in his rotations. The propriety of adopting any particular rotation must depend on the climate; for it would be absurd to attempt to make gourd-seed corn and sweet potatoes in Greenbrier; a light, sandy land should never be selected for grass, nor cold, wet, stiff land for corn; on the situation of the farm in regard to markets, for some articles will pay well in some situations that would be unsaleable in others; and upon the condition of the soil, whether fertile or exhausted. A farmer cannot carry on his business, unless he has various kinds of crops upon his farm. If he had nothing but wheat and tobacco, he might not be able to procure corn and hay. By having various articles, he does not run so much risk, either in regard to the season or the sale of his produce; and if he fails in one article, he may succeed in another. The crops should be so arranged that the labor of ploughing for each, of sowing, weeding, &c. shall proceed in a regular succession, and the labor or business of the farm should not be too much crowded at any one season of the year, but that the crops produced on the farm should be cultivated by the same hands, (except in harvest,) and the same teams. Avoid, as much as possible, having two grain crops in succession; but alternately to have grain and grass crops; in this country, a deviation from this rule must be admitted; so that small grain of some kind, must succeed corn: this is unavoidable, but must not recur too frequently. To raise those crops most likely to be productive of manure, the use of which cannot be dispensed with, under any rotation that can be devised. To arrange the crops so as to keep the land in good condition and increasing in fertility. Variations in the rotation will be found necessary and expedient, as the condition of the farm may alter. Keeping these maxims in view, the various systems that have been practised in Virginia shall now be considered.

Two years' rotation.—When wheat was first made a crop for market in that part of the state that had been previously devoted to the culture of tobacco, the rotation was corn and wheat alternately. It was soon found that this course was too hard for the land, and that wheat and corn, in such rapid succession, gave precarious and scanty crops, and that even the river bottoms could not bear such a scourge. I am satisfied that nothing short of manuring, very heavily, the half that is in corn, will justify the expectation of either good crops, or preserving the fertility the land might

have possessed when this course commenced. The impracticability of doing that without summer food for cattle, and with no winter food but what the offal of the wheat and corn affords, must cause this rotation to be rejected at once. If it was possible to ensure a good crop of clover, after every crop of wheat, I believe alternate crops of wheat and clover would be made without injury to the land: but the clover crop is too uncertain to be relied upon for this. It is rare that clover succeeds after a heavy crop of wheat, by which it is subject to be smothered; it is likewise liable to be killed by frosts and severe droughts, in its infant state, and it is said that land tires of it as soon as of any crop.

Three years' rotation.—Corn, wheat and pasture; this is the most common rotation practised in Virginia. Under this rotation, as under the last, the lands have grown worse yearly, as under that, most of the maxims upon which judicious rotations are founded are violated. There is not a proper mixture of grain and green crops; the grain crops perpetually succeed each other, and the proportion of land in grain is too great. If the farm were in good order when this rotation commenced, and the land regularly sown with red clover when in wheat, and plastered the spring when the clover was sown, and the plaster repeated the next year, and a sufficient stock kept to convert all the offal of the corn and wheat into manure, it is possible that the land would not be rapidly injured. If this course were observed, the materials for making manure would be so abundant, there is no question it could be made in large quantities, the whole produce of the farm contributing to it; upon this plan much reliance must be placed upon soiling, which the experience of many years has taught me is a precarious dependence in this climate. I am far from recommending this rotation except upon rich bottom land; but if it be pursued, I do recommend it upon the plan here suggested, with the addition of some provision of grass land for early and mid-summer pasture. One twelfth part of the most suitable land on the farm cannot be more beneficially employed than in this way. I consider cattle and hogs as an essential to every farm, not only for the purpose of making the manure necessary for the farm, but as the only means of supplying the country with food from our own resources. A farmer should buy nothing that he can make or raise for the use of the farm. If where the three years' rotation is practised, the farm should be thrown into four divisions, and one of them is kept in grass for pasture, and thrown out of the rotation for several years, the land may possibly improve in fertility, if there should be proper exertions to make and apply manure.

Four years' rotation.—Admits of greater variety in the succession of crops. The course most approved in the country below the falls of the river, which is generally denominated the corn country, from that grain being considered the staple of that district, is corn, wheat, and two years in clover. Its effects I have had no opportunity of judging of; it is recommended in such strong terms by the president of our society, that I can have no doubt of its advantages in that tract of country which is better adapted to corn than to wheat. It gives a greater proportion of corn and less of wheat, than I have been accustomed to

make, or than it is advisable to attempt in a broken stony country, inconvenient to market, and where manual labor does not abound. In a tract of country above the falls, and below the Blue Ridge, wheat is considered the staple. An increase of the quantity of corn is no compensation for a diminished crop of wheat. One fourth of a farm in wheat, and that after corn, when the crop is always worse than after fallow, is not considered enough. I once cultivated a plantation in a rotation of four years. My course was corn, wheat, clover, wheat, and the plantation evidently grew worse. I should remark, that during that experiment, the fields were not pastured, nor was I very successful with the clover crop, it having failed more than once. Three crops of grain in four years are too many for any high land. If the plantation had been laid off in five fields, and one field had been alternately thrown out of the course, as suggested in the three years' rotation, the benefit to the land and to the stock from a portion of the land being for a number of years in grass would be attained. So far as my experience or observation goes, wheat may succeed clover with every prospect of a good crop. Sir John Sinclair, however, states it to be the opinion of many of the most intelligent and successful farmers in Scotland, that clover land ought not to be sown in wheat. There may be some difference in the climate or soil of the two countries, that may make the difference upon this subject. However, it is proper that every judicious man should be on the look out, as our experience has not been such as to be conclusive. When this rotation is practised, I would pasture moderately the clover field the last year it is in grass. In every rotation where the land is to remain not more than two years in grass, I am decidedly of opinion, that clover seed should be sown on every crop of wheat, at the rate of a bushel of clean seed to ten acres. The cost of the seed is no consideration in comparison with the value of the crop or the improvement of the land from it. Many people believe, that after clover is once well taken, it is unnecessary to sow again; land will sometimes reseed itself, but it will more frequently fail. The famous Norfolk four years' rotation, which has made that one of the most productive counties in England, is turnips, barley, clover, wheat; the land always manured for turnips, and the turnips fed off by sheep, which is a dressing twice in four years.

Five years' rotation.—This is the rotation practised by Mr. Wickham upon his highly cultivated and productive estate upon James River. Its success recommends it highly on rich land. It has been in use for seventeen years; during that time his crops have been the best upon the river, and from what I hear, the average of the last nine years is at least double the first term. I have repeatedly seen his crops of wheat and clover from May to harvest, and I have no hesitation in saying, that they are the best, taken throughout, I ever saw. I have seen in other plantations, lots and parts of fields that were equal to his, but I never saw entire fields under as good crops, either of wheat or clover. Before this land came into his hands, it had been cropped in the three years' rotation. The succession of crops in his rotation is, 1st corn, 2d wheat, 3d clover, 4th wheat, 5th clover. I consider his experiment as establishing, conclusively, that by the free use of plaster of

Paris, and the proper exertions to make and apply manure, that five years' rotation may be relied upon to give fine crops on lands in good heart, and to keep the land in a state of regular and progressive improvement. Although the number of acres that are in grain by having six divisions instead of five, would be fewer, I believe the quantity made would not be lessened, and I am confident the land would improve faster, with the advantage of summer pasture for stock and the diminution of labor in seeding only one-third of the farm, instead of two-fifths, with the further advantage of commencing, whenever the extra field was to be brought into the rotation, with a naked fallow; which I fear will be found indispensable. From the increase of strong perennial plants upon our lands, since they have been less frequently than formerly planted in corn, I suspect we shall be obliged to resort to naked fallows once in six or seven years to keep them clean enough for wheat. For these reasons I should prefer six divisions; the sixth field I would use as it is proposed the fourth and fifth should be used in the two preceding rotations, to be sown with a mixture of grass seed for pasture.

Six years' rotation.—1st corn, 2d wheat, 3d clover, 4th wheat, 5th clover, 6th clover; this course of crops may be practised to great advantage upon weak or worn lands. It may be varied thus; divide the arable land of a farm into three fields, one of which for corn and clover in equal parts, one in wheat, (half corn and the other half fallow,) and one in clover. Under this course one-sixth of the farm would be in corn, one-third in wheat, and one-half in clover. That part of the clover that is in the enclosure with the corn, to be mowed for hay, and the produce of the field that is in clover to be applied to the support of stock in summer, by soiling and by being pastured.

Seven years' rotation.—1st corn, 2d rye, 3d clover, 4th wheat, 5th clover, 6th wheat, 7th clover. Perhaps as beneficial a rotation with a view either to profit or improvement would be, 1st corn, 2d rye, (the corn and rye to be consumed on the farm,) 3d clover, 4th wheat, 5th clover, 6th wheat, 7th pasture for six years, on which I would sow greensward, orchard and herds-grass, meadow oat and red clover. It will be remarked, that in this rotation the last crop in the course is wheat, and the first and second corn and rye, being three crops in succession. It is supposed the land would be amply compensated for this by the entire crops of rye and corn being consumed on the farm, and each field in its turn being in pasture six years. Where one-seventh of the land is manured for corn, the produce of two-fifths of the land that is in grain consumed upon it, and three-sevenths of the farm in grass, there can be no doubt of produce and improvement sufficient to satisfy any reasonable man. I am informed the lands on the south branch of Potomac are cultivated in corn six, seven and eight years in succession, after which they are pastured as long, and in that time are supposed to be completely renovated.

Of the foregoing rotations, I should prefer the five years' rotation for good land, but think it would be more perfect, if the farm was thrown into six divisions and one of them kept in grass the whole round. For weak or thin land, I should think the change I have suggested indispensable. With that variation one-half the land would be in grain, and the other in grass.

To avoid repetition, I have purposely omitted mentioning tobacco, not from a belief that its culture should be abandoned; on the contrary, I think it will be long one of the best articles of produce for a Virginia plantation; at any thing like the present prices, it unquestionably is so. Persons distant from market, or those who can make tobacco of the first quality, will probably find it their interest to continue its culture for a great length of time. If it is made upon new land, it does not enter into the rotation of crops; it is used as a preparation for other crops. If it is made upon old land, it should be planted upon the lands that in the different rotations I have given, are allowed for corn. It will be found an easier crop to the land than corn, and will invariably be succeeded by a better crop of wheat.

Miscellaneous observations.—It is obvious, that at the commencement of an improving system upon an exhausted farm, or upon poor land, it is proper to begin with gentle rotations; when the soil is improved, it will bear more severe cropping.

By the high price of wheat, farmers have been induced to cultivate too much land in grain, and there is reason to believe, that stock, the great source of manure, being neglected or almost given up, the soil will be exhausted by the severity of cropping. The late change in Europe to a state of profound peace, must cause the price of grain to fall, which, added to a decrease in the produce of the land, must bring distress upon the farmer; stock of every kind must rise on account of its scarcity, a circumstance which cannot be remedied for many years. The ready answer given by every man, when he is asked why he works his land so hard, is, that he must have the crop from all the land he cultivates, that less will not support his family and defray his expenses. Great and weighty considerations, I admit; but is it not a fatal error to believe, that one hundred and fifty acres of land, in an exhausted state, will produce more than a third, or at any rate half, the same land, well cultivated and improved by the manure that can be made, the free use of plaster and clover, and the proper mixture of ameliorating with exhausting crops? Let these questions be tested by experience.

John Wickham, esq., when he purchased his upper farm, I understand, could not expect more than from two thousand to two thousand five hundred bushels of wheat, annually, according to the season. His crop is now from four to five thousand bushels. Thomas Marshall, esq., took possession of his estate, when two and a half barrels of corn, and five or six bushels of wheat to the acre, would have been thought good average crops; he now makes from six to eight barrels of corn, and from fifteen to twenty-five bushels of wheat to the acre. For these facts, many of the members of this society can vouch. Little more than half Mr. Wickham's land, produces more than double the grain he used to make upon two-thirds. Mr. Marshall has been equally successful. I hope those gentlemen will favor the public, through this society, with a full statement of their improvements. Sir John Sinclair says that the lands in some districts in Scotland, were formerly cultivated in grain, three years in four; the rent was then from twenty-five to thirty shillings per acre; the same lands are now in grain not oftener than three years in six; they pay from five to six

pounds rent, and make more grain from half than they formerly did from three-fourths of the farm. These great and important changes have been made in Scotland, in about forty years.

A safe rule by which to proportion the crops of grain is, not to suffer more than from a half to three-fifths of the farm to be in grain in one year. Let the land that can be manured, be the limit of the corn crop, to be succeeded by wheat, rye or oats, according to the soil, and the relative value of each species of grain, and then complete the rotation by alternate crops of small grain and clover, allowing one field to be always in grass for pasture. I fear many farmers will be deterred from following this advice, from a belief that it is impracticable to accomplish what I propose. I pledge myself that any man who will make proper exertions, may make the quantity of manure that will be necessary. A farm of three hundred acres in six fields will have six of fifty each; twenty loads of forty bushels to the acre, will require a thousand loads for a field, to be spread over the surface equally. If the manure be applied to the hill or the drill, one-fourth of the quantity will be sufficient for the corn crop. The application in either mode will give from two hundred and fifty to three hundred barrels of corn from the field, as the year is favorable or otherwise, in one of these modes. I know it is in the power of every man upon such a farm, to manure fifty acres; if he will provide winter and summer food for his stock, and use due diligence in making and saving manure, and consume all his wheat straw and corn stalks as litter for his stock. In this way, then, half the land will be made to produce the quantity of corn usually made, with a great saving of labor, a certain and constant improvement of his farm, and a crop of wheat, double what he would make, when one-third of his land was planted in corn, and all his wheat made upon corn land.

The nature of the soil should have the greatest influence in deciding upon the crops to be made. In most cases, that crop will pay best, that the land is best adapted to. If the distance from market is too great to transport grain of any sort, still it is made to great profit, for fattening stock and for distillation. On the south branch of Potomac, corn is the principal crop. Where the lands are peculiarly adapted to corn, let that be made the staple; so as to wheat, and every other plant which is cultivated. Upon the dry, thirsty uplands of the mountainous country, corn is as precarious a crop, as wheat is upon the light lands of the lower country.

The great error in Virginia, heretofore, has been, that we have cultivated our lands without intermission; that we have attempted crops without any attention to the quality of the land, or the fitness of its culture; that we have taken every thing from the soil, without returning any thing to it, and that even now, when there is a strong solicitude to improve our lands, we are attempting it in a way that cannot succeed. I believe that by the due application of plaster, and the proper mixture of clover crops, if the clover succeeds, good land may be kept in heart; but if our lands should tire of clover, or become clover sick, as has happened in other countries, this resource will fail. Is there any man so credulous as to believe, that by clover and gypsum alone, the gullied and exhausted lands of Virginia can be reclaimed? I believe not;

if there should be, I can assure him he will be disappointed. Before clover will perform its office, the land must be made capable of holding and sustaining it; nothing but manure will enable such land to do this, and to have manure, there must be stock on every farm, with a sufficiency of food for winter, and pasture for summer. Soiling for some time, may be practised to advantage, but it is not to be relied upon in this dry, hot climate, with any certainty, for more than two months, and can scarcely be practised at all in the harvest month, from the middle of June to the middle of July; because the farm hands are fully employed in securing the grain crops. Instead then, of excluding stock from our farms, they should be considered indispensable, not only for the purpose of making manure, and for the necessary supply of the farmer, his family and laborers, with meat, milk and butter, but as a means of affording income. Instead of Virginia having a surplus of meat and horses, as she ought to have, our supply is drawn to a very serious and alarming amount from other states. A vast proportion of the beef and pork consumed in our towns, and much of that which is used in the country by the farmers, is brought from other states. I am sure it is a reasonable estimate to say, that Virginia has paid, in the last five years, to the people of the western country and North Carolina, not less than a million of dollars a year for cattle, horses and hogs, nearly one-fifth of the value of our tobacco crop, thereby impoverishing the people, as well as the land of Virginia.

I have no scruple in saying that at this day there is less pasture land and less stock in Virginia, in the country east of the Blue Ridge, than there was thirty years ago. I must not be understood to approve of the ancient management of stock and pastures, when the stock was permitted to roam over the plantations, during the winter, and poach the earth, nibbling every atom of herbage that escaped the frost, and snatching every particle of the spring growth, as fast as it was high enough to enable them to bite it. Under this management, the land was injured and the supply of food inadequate; the stock miserably kept through the winter, a great loss in the spring of every year, half starved through the summer, and the manure from them at all seasons, small in quantity and meagre in quality. Instead of which, I recommend the forming of lots for the spring use of milch cows, yearling calves, mares and colts, and ewes and lambs: the more hardy stock to be kept upon dry food until the woods will sustain them, which they will do for two or three weeks in all the upper and most of the lower country; after which, towards the middle of May, the common pasture of the farm may be used, and soiling commence. One-twelfth or fifteenth of the farm of suitable land, in three or more grass lots, on a farm of any size, to be sown in greensward, orchard and herd's grass, meadow oat and red clover, will be of as much value as the same number of acres, in any crop, deducting the expense of culture, that ought to be charged to either grain or tobacco. When the common pasture is open to stock, or when it shall be sustained by soiling, the lots to be shut up for summer use—after the first of September there is never a want of pasture. From that time until March, the lots should not be depastured; the fall

growth will be very considerable, which will be valuable food in March and April, the top of it only being injured by the frost. Where there are two fields of clover in the rotation, perhaps a better use for the land cannot be made of one of them, than to pasture with stock with due caution. Exclude every thing until the clover is in full bloom, continue the stock upon it only long enough to make way for the second crop, excluding them always when the land is wet. There is no stock on a farm more benefited by clover, or less injurious to it or the land, than hogs. Except for the comfort of resting themselves in wet or moist places, in very hot weather, hogs will not root, particularly when the land is dry, if they can get plenty of food without it. They have the ability to procure sustenance in that way, but I am satisfied it is only necessity that makes them resort to it. By using one of the divisions of a farm for pasture, with the aid of lots, I am satisfied that as much manure may be made and applied every year to the field in corn as will make it a fine crop; that horses enough may be raised in Virginia for our own use, and that instead of purchasing a great proportion of the meat we consume, in a very few years, we should have a considerable quantity for exportation.

Here I beg leave to call the attention of the society to the effect of fattening stock on the farm, with a proportion of its produce. It is to make the land more productive in every thing from the vast quantity of the richest manure it affords, which imparts its fertilizing power to every part of the farm in its turn. If the crop of corn is consumed by cattle on the farm, there is no question but that the subsequent crops, both of corn and wheat, will be increased, by the application of the manure it will furnish, which excess may, of itself, pay a good price for the corn so consumed. If in addition, you can obtain a fair price for the corn, by the fattening of cattle, with a saving of the trouble and expense of its transportation, the farmer would be doubly paid. I am warranted in recommending feeding stock by the success of the South Branch farmers, who have become in thirty years, the most wealthy in Virginia, by the culture of corn, without ever having exported from the district, one bushel in grain; the whole crop being consumed on the respective farms. In Great Britain, the advantage and propriety of this practice are so fully understood, that there is never more than from one-third, to half their farms, appropriated to grain. The vast product of potatoes, turnips, cabbages and grass are applied to the feeding of stock, on their farms. In this way they believe, and I have no doubt of the fact, that they make more grain than they would do, if a greater proportion of the land were made to produce it. In England, this practice is carried so far, that oil cake is purchased and used for fattening cattle, with a knowledge that its chief benefit is derived from the richness it imparts to the manure, made by the cattle to whom it is fed.

The wisdom and economy of making as much grain upon twenty acres of land as they formerly made upon fifty, are there fully understood, and they are so rational as to believe it is better to have their farms improving than decreasing in fertility—and this is done by men who have only a short and temporary interest in the land, while we, the people of Virginia, who pride ourselves in

being the lords of the soil, show so much indifference to its preservation. It is believed, and I fear justly, that our climate is unfavorable to the product of potatoes and turnips, which I consider a misfortune; but it is not pretended that either our soil or climate is at all so, to carrots, parsnips, scarcity, Jerusalem artichokes, or the sweet potato, cabbage, rape, or Swedish turnips. We have a great resource too in pumpkins, not less valuable for the quality of the food, than any of the roots, and only made so, by the time at which they must be consumed. Much of our grain, both corn and rye, might be fed to great advantage, by being ground and fed on cut straw, or steamed, and perhaps more profitably than to sell it in grain, at the common prices.

The benefit to the farmer and to the land, from feeding stock, is so well understood in Great Britain, that it has become an agricultural maxim, that whenever a farmer discovers he can be as well paid, by cultivating food for cattle as for man, he should prefer it, because of the increased quantity of manure it gives. Mr. A. Young remarks, that "that country, that farm will be most improved, and most productive, upon which the greatest quantity of cattle and sheep are kept. This holds good, of an acre, a field, a farm, a district, a province or a kingdom."

By providing food for a due proportion of cattle, hogs and sheep, the quantity of grain will be increased, and "the meat, cheese, milk, butter, wool and leather, are so much additional produce gained from the land; by means of which, the wealth of a country and its power of providing for a numerous population, is enormously increased."

I trust there is no possibility of my being so far misunderstood as to have it supposed, that it is my desire to convert all our arable into grass land, or that I wish to increase the quantity of grass by diminishing the product of bread-stuff. I recommend stock as an auxiliary, whose agency is to be made to contribute to the increase of the grain crop, and to be subservient to that object. It is essential to the utility and chance of profit from stock, that they should be abundantly fed through the year, and the quantity of stock kept proportioned to the food provided; remembering always, that it is better for every purpose that a farm should be under than overstocked. In the neighborhood of my estate in Albemarle, we have no resource for the summer support of cattle, but those furnished by our arable lands. We are without swamps or marshes, and we are so fortunate as to be able to cultivate all our cleared lands in succession. I do not believe within eight miles of Warren there are fifty acres of waste uninclosed lands. Under these circumstances, we must abandon stock or depend upon what can be derived from the farm by pasturage and soiling.*

W. C. NICHOLAS.

* The following is an extract of a letter from a gentleman of the first respectability, who is distinguished as a farmer, and who has improved highly a tract of land that had been very much exhausted. It is published to corroborate my opinion of the importance and value of stock, both with a view to the improvement of a farm and the profit to be derived from it:

"I regret that it is not in my power to give any thing like a satisfactory account of the ancient mode of cultivating the soil which it has fallen to my lot to manage. The modern and more improved mode of

PLASTER OF PARIS.

From the same.

Clifton, October 16, 1818.

Dear sir—The following facts go farther in establishing the duration of the effect of plaster of Paris on clover, than any I have seen or read of, and are therefore thought worthy to be communicated.

In the year 1813, I purchased a tract of land in Goochland county, then in the occupancy of Mr. George Harding, as tenant for years, whose lease expired at the end of the succeeding year. One of the fields of highland, in wheat, after corn, at the time of the purchase, was again in wheat in the year 1814. In 1815 I pastured it; in 1816 sowed oats, and in the fall sowed wheat. In the spring of 1817 sowed clover and plastered at the rate of a bushel per acre, but left a belt unplastered, about fifty feet wide, through the field. The difference between the clover in the belt, and that on either side, was manifest in the fall following, and in the latter part of April, 1818: that in the belt was about three inches high, of a pale green color; and that on each side about nine inches high, and of a deep green. At this period, while riding over the field, I discovered in the unplastered belt, a number of tufts of clover, about the size of a man's hat, equal in luxuriance to that which was plastered on either side. Upon farther examination, I found that these tufts were in exact checks, about the usual distance of corn rows. It occurred to me immediately that Mr. Harding must have plastered corn there in the check. Upon reporting the fact to him, however, he says that he never used any on that part of the farm, but that Mr. Peter Baker, his stepfather, and predecessor, planted in corn, in 1805, and put a measured spoonful of plaster into each check, but never discovered any benefit to the corn. Mr. Harding further states that he never knew any plaster to be used in that part of the farm, by Mr. Baker, either before or after that time. Nor did he ever know clover seed to be sown there. The tufts before mentioned, kept pace in their growth with the plastered clover on each side of the belt,

farming had already been adopted in part, when I came here to reside. The ploughing, however, is deeper now, and better executed than formerly; plaster of Paris is used in greater abundance, and more manure is carted out upon the fields. Not long after my arrival, my stock of cattle was considerably diminished, with a view to give the land as much as possible the benefit arising from clover considered as a mere manure. For five or six years I have been nursing my land carefully, and have had some very poor fields to reclaim; but I am now able to fatten 50 or 60 beeves annually for market, without sustaining any inconvenience; indeed I consider the grazing of those fields which I propose to fallow in any given year, as a decided advantage; because I am enabled, by this means, to have the ploughing executed more effectually, and to prepare a good seed bed for the wheat. The surface of our country is much broken and exhibits many poor knolls, where improvement has not progressed far, which are not only a great detriment to the appearance, but a material drawback upon the produce of our wheat fields. Upon some of those spots I have been in the habit of having my farm cattle penned every night, and others I have endeavored to cover with manure. The results have been in every way satisfactory."

which became sufficiently luxuriant to make a fine crop for the scythe, when the clover in the unplastered belt would have afforded but indifferent grazing, except the rows of tufts, which were so luxuriant as to be distinctly counted at the distance of half a mile: and, indeed, are visible at a considerable distance, to this day, notwithstanding the field has been heavily pastured during the last three months.

It will be observed, that as far as this statement goes, the field alluded to above has undergone a hard course of cultivation, and from its appearance at the time I took it, and other circumstances, I think it fair to presume it had been severely pressed, from the time the plaster was deposited in the checks. I never perceived any spots in the crops of grain which could lead to a conclusion, that the plaster had any effect on them. It appears, then, that it must have been, for the most part, inactive during twelve years from the period at which it was deposited in the earth. And if we suppose that the frequent ploughings and harrowings it underwent, dispersed it in such a way as to leave not more than a proportion equal to that on each side of the belt, which I think would not be far from a fair supposition, it would appear to have suffered but little diminution in its fertilizing principle.

With very great respect, I am, yours,

RANDOLPH HARRISON.

DR. JOHN ADAMS,

Secretary Virginia Agricultural Society.

CULTIVATION OF COTTON IN BRITISH INDIA.

From the New York Journal of Commerce.

London, August 31st, 1840.

This subject has for many years occupied the attention of English capitalists, but it is only within the last year or two that any very serious efforts have been made to reduce the theories advanced to any practical result. There has been a growing anxiety in this country to render the manufacturer of cotton goods, if not independent of the United States for the raw material, at all events less dependent than he hitherto has been; and a very strong feeling appears to exist here, that at no very distant day, British manufactured cotton goods may be formed entirely of cotton raised in the Indian empire. Since the trade has been thrown open with India, and the monopolies of the East India Company half crushed, if not annihilated, private enterprise has been directed to this important branch of trade, and several of the most scientific and practical men in the United States, occupied in the growth of cotton, have been closely questioned and consulted as to the propriety and prospects of similar plantations on the other side of the Cape of Good Hope. From all the information that has yet been gleaned, the inquirers appear to be satisfied that there is no insuperable bar, rational objection, or even feasible reason, why cotton should not be equally as well grown in India as in the south of the United States; and having engaged many first-rate overseers from South Carolina, it seems they are resolved to go seriously and strenuously to work to test the experiment. Four gentlemen, of considerable intelligence, and from what I learn, who have

been all their lives engaged upon cotton plantations in the United States, have arrived in this country within the last fortnight, and are about proceeding for India, to superintend plantations, either formed, or about to be formed, in the presidencies of Bombay and Bengal.

Very recently a special meeting of the Manchester Chamber of Commerce was convened for the express purpose of entertaining this interesting question, and as the doings on that occasion are so important to your merchants and southern friends, I will endeavor to give you a sketch of the proceedings. On the table were three specimens of India grown cotton, from the same piece of land, and they had all undergone "one of the first operations of manufacture." Two of these specimens had been ginned in the usual way, and the third had been operated upon by a machine for 'ginning,' the invention of Messrs. Fawcett & Co. of Liverpool, and owing to its superior appearance and cleanliness, was admitted to be worth "a farthing to three-eighths of a penny" more than those specimens which had been prepared in the ordinary manner adopted in the United States.

The chairman of the Chamber, Mr. J. B. Smith, expressed himself in very sanguine terms. "There was nothing," he observed, "in the course which the Chamber had pursued, that could afford the least ground of jealousy on the part of our brethren in the United States. The Chamber, he had no doubt, were all wishful that we should deal with our colonies in their produce, rather than with other and independent countries. They had no wish to put down the growth of cotton in any country. On the contrary, it was their wish that it should be cultivated wherever it was possible."

It appears that the East India directors finding that a number of spirited individuals had resolved upon the cultivation of cotton in India, made a virtue of necessity, and set about inquiring into the possibility of the thing for themselves. The consequence of their researches was a report which Mr. Smith, at the conclusion of his address, introduced, and which was read to the Chamber.

That report, framed evidently with great care and the result of the minutest investigation, is a document almost too important for condensation, but as it is more than probable that you will give it at some future day, entire, I will merely run over its contents. It begins by stating that "The question of obtaining cotton from various countries must necessarily be interesting to a manufacturing community whose prosperity greatly depends upon a plentiful and steady supply of the raw material, since it must be obvious that security against the contingencies of failing crops, political disagreements, or unsteadiness of price, arising from speculative combinations, must be in proportion to the number of channels from whence we derive our supplies." The chamber is then congratulated on the progress made for obtaining "an increased supply and improved quality of East India cotton," and a description is given of the successful manner in which cotton has been cleaned in Bombay. The mode of performing it, however, is declared to be both slow and expensive, requiring some mechanical skill to meet the otherwise "insuperable obstacles to a greatly extended production of cotton in the colonies." To aid in the enterprise, all transit duties have been abolished in Bombay,

and the same policy is about being adopted in Madras. The Governor General of India has offered three prizes for the growth of a certain quantity and quality of cotton. The first 20,000 rupees—the second 10,000 rupees—and the third 5,000 rupees. Captain Baylis was despatched by the India government to the United States for the purpose of engaging competent persons to superintend the culture, and has succeeded in his mission. He is on the point of returning to India with a collection of a considerable quantity of seeds, and also with several American saw gins for cleaning cotton.

The several gentlemen who had consented to accompany Captain Baylis from the United States to the East Indies, had been introduced to the Committee of the Chamber, and had pointed out to them the deficiencies of Indian cotton, "particularly in reference to its cleanness and irregularity of staple, both of which they expressed confidence in being able to improve." The same mills have been set up in Liverpool, and on the 17th of July last, some members of the Court of Directors of the East India Company, with several gentlemen of the Manchester Chamber of Commerce, assembled at the former place "to witness the experiment to be made in the machinery for cleaning cotton. A repetition of these experiments was also made at Manchester, and the result was that the directors of both bodies "consider those experiments to be, on the whole, highly satisfactory, as proving, beyond a doubt, the practicability of cleaning India cotton with the American saw-gin; although it is evident, at the same time, that personal skill and experience will be requisite to adapt the machine to the particular species of cotton it is intended to operate upon."

The special report of the directors of the Chamber then goes on to state that "it appears to be a very judicious arrangement which the Hon. East India Company has adopted, viz: to send over to India, with the machines, several talented and experienced gentlemen, natives of the United States of America, and brought up as cotton planters, who will be able to give a new impulse to the growth of cotton in India, and to devise and carry into effect the best methods of driving the saw-gin and applying that machine to the very important purpose of cleaning the cotton so produced."

The vital importance of the American saw-gins will be seen at once when you remember that with one of these machines 1100 lbs. to 1200 lbs. weight of clean cotton can be produced per day, whilst the machine used in India, the Chinka, can only prepare from 38 lbs. to 40 lbs. per day. The machine, also, that has been invented by Messrs. Fawcett & Co. is stated to be even a decided improvement upon the American saw-gin, so that every opportunity is now given to the growers of cotton in India to compete with the American market. The planters who have been engaged from the United States, are so engaged for five years, and their experiments are to be carried out on a most extensive scale. There can be no doubt that with such a wealthy body as the Lords of Leadenhall street—the East India Company—to back and support them through all their endeavors, something will now be done.

Bearing upon this subject, though partially, is the meeting held on the 27th at Manchester for establishing the "Northern Central British India

Society." The celebrated Mr. George Thompson* has been instrumental in getting up the steam on this occasion, and "Charles Lennox Redmond, a gentleman of color, anti-slavery debater from Pennsylvania," was paraded upon the platform. The chairman declared that the object of the meeting was to aim a deadly blow at slavery, and to transfer our market from the slave grower of cotton in America, to the free grower of British India. The principal speakers were Mr. Thompson and Mr. O'Connell, and the latter came from Ireland expressly to attend the meeting. Mr. Thompson declared that there was no measure so calculated to effect the downfall of slavery in the United States, as by encouraging the growth of cotton by free labor. He instanced the superior cheapness of free labor over slave labor by the cultivation of indigo. Fifty years ago it was wholly supplied by slave labor, but now the slave grown indigo of the Carolinas and South America has been superseded, and the three millions of it which they imported into Europe has dwindled beneath an ounce.

In allusion to the part taken by the East India Company, which I have above described, Mr. Thompson declared that it was an event in history that could not be matched for two hundred years. Mr. O'Connell's speech was particularly remarkable, for it did not contain one single sentence of abuse against the south. It was confined entirely to a description of the atrocious tyranny exercised over India by the company, and demonstrating the miseries, privations, famines and death, which have been the melancholy consequences of their iron rule.

J. W. G.

CURING AND STACKING FODDER.

From the Carolina Planter.

Mr. Editor:—Until last year, I was in the habit of curing my fodder wholly in the sun and putting it up in double stacks. This I call the old plan. The objections to it are, in the first place, that many of the leaves dry, crumble, and are lost, ere the stems and succulent portions are fit to be stacked. In the second place, that an intensely hot sun is hurtful to the fodder, that cured, in the shade being always the most fragrant and nutritious. It is the practice of the best English, French and Flemish farmers, in curing their hay, to expose it as little as possible to the sun. It is carried in dry, but it preserves its green color; and you see hay two or three years old in their market of so bright a green color, that we would scarcely conceive it to be cured; yet they are in the practice of preserving it for years, and value it more for its age.—Cured in this way, scarcely a leaf is wasted and the hay preserves its freshness and fragrance; and it is said that at least ten per cent is gained in quantity, and as much in quality. A third objection to the old plan is, that the fodder is more liable to be seriously injured by dews and rain; and the fact is, in a season like this, when we have had rains almost every day, if we are to depend upon curing our fodder wholly in the sun,

* The English missionary abolitionist, who made a figure in the United States a few years ago.—ED. FARM. REG.

we shall not have one good stack in ten. If therefore, we can fall upon a plan by which we can make better fodder and with less sunshine, we shall of course, be running less risk, and stand a better chance of getting in that part of the crop. With this view, I have the fodder that is pulled in the forenoon; stacked in the evening of the same day, provided there has been no rain about it. If it is wet, I allow it to become perfectly dry before it is stacked; and my plan of stacking is simply this:

A pole is placed in the ground, at the spot where you intend to stack. Four other poles, or fence rails, if your stacks be small, are placed around the centre pole about a foot or more from the bottom, and then all tied together at the top, with a grape-vine or any thing handy, forming a cone. Place some brush or a few rails at the bottom, so as to raise the fodder a little off the ground. Then commence laying your fodder in *single bundles* around this cone, and when you have finished, it will be a *hollow stack*. The air having free passage underneath the stack, will circulate in the hollow, and the fodder will finish curing in the *shade* and unexposed to the weather. You may cure and stack pea vines in the same way.

For this improvement, as I conceive it to be, I am indebted to an old agricultural friend who has had forty years' experience in planting, and who had all his life followed the "good old way" of curing and stacking fodder, until about two years ago he happened to learn from an *agricultural paper*, not an "*old negro*," that the best mode of curing hay, &c., was to expose it but little to the sun, he conceived his plan of stacking fodder so as to have it cured partly in the shade. He has adopted the plan for the last two years, and thinks he makes better fodder by it, and certainly runs less risk of weather. I have also had my fodder stacked in the same way, and am much pleased with the plan; and I now send it to you to make "*book knowledge*" of it.

FENUM.

INDEPENDENCE.

From the Journal of Commerce.

Scarcely any thing is more desired, or more misunderstood, than independence. When a man has acquired a great amount of property, and has a great number of tenants and clerks and servants, and above all a vast circle of fashionable acquaintances, so that the keeping of his happiness is in a thousand hands, from some one of which he is always suffering, then he is called independently rich. He cannot appear abroad without the help of a retinue, nor then but on condition of being dressed exactly so, and conforming without scruple to all the follies and sins which the fashion of his class decrees—all for the sake of being independent.

In judging of independence in others, men commonly take themselves as the standard. They deem all other men who think and act as they do, independent. Thus a politician, so long as he adheres to the opposite party, is a slave to party discipline, to bribery, corruption, the possession or the hope of office. But so soon as he comes over to our side, he instantly shows that he is a man of sterling independence. He has broken the

shackles of party, which his generous spirit could no longer brook. Men love independence in themselves, and think they admire it in others. Above all they admire it in an editor. An independent press is the *beau ideal*, the beautiful thing, of their admiration. Especially in a free country and among an intelligent and moral people, every body says the press should be independent. Yet how few there are who mean by this any thing but a press which will reiterate just what they themselves think and believe. To be unconvinced by arguments which are so convincing, and to differ in opinion from men so universally in the right as themselves, is a kind of independence which few men will endure. They cannot understand how any can be so perverse as to differ from them, except under the influence of some bank or other hot-spring of corruption. There is nothing about which men desire an independent press so much as in politics; and there is no topic on which they bear independence so poorly. About these matters there is nothing excites more anger than simple statements of well authenticated facts. Even some good men get so becrazed, that although they will labor industriously and give their money freely to support and spread the truth in other departments, they will not consent to have a newspaper about their premises unless it will repeat all the falsehoods, vituperation and personal blackguard of the party press.

Bonaparte wrote to his wife very truly, "There are no such slaves as we." So it is generally. The higher men rise in authority as it is called, the more completely are they subject to the control of those whom they govern. The more they succeed in the accumulation of money or power, the more they render themselves dependent. True independence is best secured in narrow circles, by prudence, industry, and integrity, and a generous distribution of surplus possessions to supply the deficiencies of others.

"SHIPPED IN GOOD ORDER AND WELL CONDITIONED."

From the Alexandria Gazette.

The following remnant of the early times, when women were willing to get married, and not ashamed to own it, is a letter accompanying a shipment of marriageable ladies, made from England to the colony in Virginia. It is dated,—

London, August 21, 1621.

"We send you a ship; one widow and eleven maids, for wives of the people of Virginia: there hath been especial care had in the choice of them, for there hath not one of them been received but upon good commendations.

"In case they cannot be presently married, we desire that they may be put with several householders that have wives, until they can be provided with husbands. There are nearly fifty more that are shortly to come, and are sent by our Hon. Lord and Treasurer, the Earl of Southampton, and certain worthy gentlemen, who, taking into consideration that the plantation can never flourish till families be planted, and the respect of wives and children for their people on the soil, therefore having given this fair beginning; reimbursing of whose charges, it is ordered that every man that

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marries them, give one hundred and twenty pounds of best leaf tobacco for each of them.

"We desire that the marriage be free, according to nature, and we would not have those maids deceived and marry to servants; but only to such freemen or tenants as have means to maintain them. We pray you, therefore, to be fathers of them in this business, not enforcing them to marry against their wills."

MANURES.

From the New England Farmer.

Experiments are reported as having been recently made in England with saltpetre, with much success. In the cases referred to it was applied to wheat but its application to other crops has proved equally favorable and encouraging. It is not a new experiment. We know several cases in this country of its successful application, of which we shall speak hereafter; but we shall give the experiment now referred to in detail, because it seems to have been made with considerable care, and its results are professedly given with exactness.

The Harleston (England) Farmers' Club put it to their members as a subject of the highest moment, to make exact observation and experiments with various manures. Certainly no matter connected with the improvement of agriculture can be of more importance.—At a recent meeting the subject of saltpetre was discussed. Various experiments were reported. We select one of the strongest cases, they say, "the application of saltpetre as a top-dressing to wheat after pease, on a light land with a gravelly subsoil."

"One hundred weight per acre was sown by hand on the 6th of April, and to prevent any error which might have arisen from a difference in soil of one side of the field from another, the saltpetre was carefully applied on every two alternate ridges. The two crops were reaped, stacked, and thrashed separately; and the result was an increase of six bushels of wheat, and upwards of two and a half hundred of straw per acre, obtained at an outlay of 27s. sterling only, as follows:

Produce per acre of wheat which had	St.	lb.
been manured with saltpetre,	160	2½
Produce without saltpetre,	133	12½

	Increase,	26	4
Produce per acre of straw with salt-	Cwt.	St.	lb.
petre,	23	4	13
" " " without saltpetre,	20	7	8

Increase 2 5 5
Cost of the saltpetre was 27s. sterling per cwt. The wheat of course was winter wheat, and it was sown broadcast. A stone is 14 lbs.

The society proceed to report:—"It is the unanimous opinion of this meeting, that saltpetre is a most valuable addition to our list of manures. Strong evidence has been given of the benefits conferred by it on wheat, clover, and other layers, and tares on light land; and on clover layers on heavy land: in each case the saltpetre was applied in the month of April, and at the rate of one hundred weight per acre. The effect would probably be increased (but this is at present unsupported by

evidence) by applying only half the quantity of saltpetre at first, and the remaining part a few weeks afterwards."

The experiments which have come under our own observation, have been upon grass and wheat. The effect upon grass was quite remarkable. The wheat was in a growing state; the saltpetre applied when six inches in height; the quantity per acre not noted; the difference between the part not dressed with saltpetre and that to which it was applied was obvious and striking; the wheat was then in flower; it was intended that the result should be accurately observed; and we hope presently to be put in possession of it.

Any person of common observation, and at all interested in such subjects, cannot fail to observe the immense quantities of manure which are absolutely thrown away on our farms, in our cities, and about our roads and buildings. What a blessing it would be, if we had something of the reported frugality of the Chinese, on the score of cleanliness and health, as well as interest. How few of farmers ever think of saving their soap suds. We fear, without meaning any reproach upon the gude housewives, that some of them do not hear of such a thing as soap suds as often as might be useful! But how few ever think of saving and applying it; and yet it is a most valuable manure; and by having a vault or pool in which to deposite a pile of loam, or large heap of earth, by regularly throwing the contents of the wash tub upon it, might be converted into the means of greatly enriching the land; and what tune upon tune of the most valuable liquid manure, by a little pains-taking and contrivance, might be obtained in the city, by farmers, who are now willing to come four and six miles and transport fire-branded and dried horse manure at a cost, before it reaches their farms, of six and eight dollars a cord.

The French are now taking great pains to save the water in which the wool is washed at the woollen factories, full as it is of soap and animal oil, and find it a most valuable application to their lands. We have long known the value of the refuse wool; and we have stood by the mill-shute in Lowell more than once with feelings of serious regret, when we have seen the wash from their woollen factory, full of enriching matters, mingling with the waters of the river and passing off into the ocean, as so much valuable material absolutely thrown away.

Our highly respected friend Bement, of Albany, has made some very successful experiments with hogs' bristles, applied in this potato hills and in other forms. He speaks of their beneficial effects as quite remarkable; and we promise ourselves the pleasure of hearing from him on this and the use of various other manures, in which he has been experimenting. We can confidently rely upon his observations and experiments as intelligent and exact; and the results which he gives under his own hand, as certain. H. C.

EXTRANEOUS MANURES—NITRATE OF SODA.

From the British Farmers' Magazine.

It is reported, that a remark was made by Lord Kames, 90 years ago, that such improvements would be made in agricultural chemistry, that suf-

ficient manure for an acre would one day be carried in a man's coat pocket; and that a trite answer was made to the remark, that the produce from such manuring would then be brought away in the waist-coat pocket. Now, although this period has not yet arrived, yet something approaching to the small quantity of manure necessary to give vigor to an acre of wheat, has been proved on Guilford Downs during the past year; not that this kind of manure alone was taken up by the crop, but that it formed a great stimulator to the extra growth there cannot be a doubt; bringing into activity probably some latent manures lying in the ground; for a strong alkali will convert oleaginous matters into saponaceous consistency, and in that state becomes soluble in water: hence it is taken up by the spongelets of the roots in a liquid state. Those persons who consider quantity necessary in manuring ground are sadly mistaken, intimate mixture with the soil, and capability of becoming readily soluble, being necessary points for consideration. In March, 1839, Mr. John Ryds, bailiff to Frederick Mangles, Esq., of Down Farm, Guilford dressed over many acres of wheat with 1 1-2 cwt. of nitrate of soda to the acre, leaving about half an acre in the middle of the field undressed. The difference in the color of the wheat was seen in the course of 10 days; when nearly ripe, the straw had the appearance of being 9 or 10 inches longer than the other part, and much stronger; at reaping seven rods of each part were measured, cut, and kept separate; the nitrated part produced 24 sheaves containing 11 gallons of wheat and 54 lbs. of straw; and where the seven rods were not so dressed, the produce was 16 sheaves, containing 6 1-2 gallons of wheat and 40 lbs. of straw.

A BOTTOMLESS LAKE.

From the New England Farmer.

A writer in the Troy (N. Y.) Mail, gives the following account of a remarkable pond in Sussex county, in the state of New York.

"White Lake is situated about one mile west of the Paulius Kill, in the town of Stillwater. It is nearly circular. It has no visible inlet, but its outlet is a never falling stream, of considerable magnitude. The name is derived from its appearance. Viewed from a little distance it seems of a milky whiteness, except a few rods in the centre, which by the contrast appears perfectly black. The appearance itself is singular enough, but the cause is still more remarkable.

From the centre or dark portion of the lake, at stated seasons, innumerable quantities of shells are thrown up, of various sizes and forms, but all perfectly white. These float to the shore, and are thrown upon the beach, or sink into shallow water. Hundreds of bushels might be gathered from the shore after one of these periodical up-risings; and the whole soil for several rods on every side of the lake, is composed of these shells, broken or decomposed by the action of the weather. In the centre of the lake, bottom has never been found, although it has been sounded to the depth of several hundred feet.

Where then is the grand deposite from which has been swelling up since the memory of man, these countless myriads of untenanted shells? Is

it possible that though far remote at an elevation of several hundred feet above them, this bottomless well may, by some subterranean communication, be connected with the grand shell marl deposit in the eastern part of the state?"

EXTRACTS FROM "OBSERVATIONS ON THE CULTURE OF SILK."

By the late Archibald Stephenson, Esq. of Mongreenan, in Ayrshire."

From the Technical Repository.

Having resided for five years in the provinces of Languedoc and Quercy, in the south of France, where the utmost attention is paid to the culture of silk; I embraced that opportunity of observing with care, the manner in which this lucrative branch of manufacture and commerce was carried on: and indeed, I was led to bestow the more attention upon this important subject, from an idea I entertained that this valuable culture, by proper care, might certainly be introduced into Great Britain, particularly in the southern parts of this island, where there are large tracts of land, which would answer perfectly for the production of the mulberry tree, and which, from the nature of the soil, can never be employed to any great advantage in raising of corn.

It appears proper to begin, by giving some little account of the mulberry tree, since, as the society justly observes, this is the first object which claims our attention; because we must first of all make some provision of food for the silk-worms, before any trial at large can be carried into execution with any propriety, or indeed, with any rational hope of success.

There are two kinds of the black mulberry tree which have been cultivated in France. The first of these bears a fruit well known and frequently presented at table, being the same which is cultivated in our gardens in the neighborhood of London. But the leaves of this tree have been found from experience, to be too harsh and too succulent to prove in every respect a proper food for the silk-worm, and the silk it yields turns out to be coarse and of an inferior quality.

The second kind of the black mulberry tree carries a fruit inferior to the other in point of size, and improper for the table; but the leaf of it has been found to be superior to the first, as food for the silk-worm; and it is less harsh, less succulent and yields silk of a finer quality than the one first mentioned.

This second sort of the black mulberry is, in all probability, the particular kind, which is said to be at present cultivated in the kingdom of Valencia, in Spain, for the use of their silk-worms; and, indeed, many of their old plantations in France, consist of this sort. But their new plantations consist wholly of the white mulberry tree, hereafter to be mentioned, which is the only one they now cultivate in all their nursery grounds, for the use of their silk-worms; so far at least as I had occasion to see them.

There is a third sort, known by the name of the white mulberry, the leaf of which is more tender and less succulent than any of the other two,

and has been found to produce silk of the finest and best quality.

For a number of years after the culture of silk was introduced into France, the people were accustomed to employ the leaves of all the different kinds of mulberry trees before mentioned, promiscuously; and some grafts of the white mulberry from Piedmont, and from Spain, which carried a larger leaf than the one they had got in France, having been obtained from these countries; these grafts were put upon French seedling stocks, which had the effect of increasing greatly the size of the leaves, and was regarded as an acquisition as it certainly produced a large stock of leaves as food for the worms. The consequence of which was, that this practice of grafting prevailed for a great many years all over Provence and Languedoc.

But Monsieur Marteloy, a physician at Montpellier, who had made the culture of the silk-worm his particular study for a number of years together, at last made it clearly apparent to the conviction of every body, by a regular course of attentive and well-conducted experiments, that the leaf of the seedling white mulberry was the food of all others the best for this valuable insect; as the worms which were fed with this particular leaf were found to be more healthy and vigorous, and less subject to diseases of any kind than those that were fed upon any of the other kinds of leaves above mentioned; and that their silk turned out to be of the very best quality. Since that time, namely, 1765, a decided preference has been given to this particular leaf beyond all the others.

I shall therefore go on to observe, that their first object is to make choice of a spot of ground for their seed bed, of a gravelly or sandy soil which has been in garden culture, or under tillage for some time, and which they know to be in good heart.

From the experiments carried on by Monsieur Marteloy, that gentleman made it fully appear that the leaves of the trees which grew in a rich soil were by no means proper food for the silk worm, as they were too luxuriant and full of juice for them; and that the leaves of those trees which were raised in a gravelly or sandy soil, where no manure was employed, were greatly to be preferred.

From these experiments also, one of the reasons and apparently the principal one may now be pretty clearly pointed out, which rendered abortive the trials made in England, during the reigns of James I. and Charles II. for introducing the culture of silk into Great Britain; though that reason was altogether unknown in England, at the times these different trials were made. It appears to have been only this, that they had no other food to give to their worms but the leaves of the black mulberry, carrying the large fruit usually presented at our tables, which is now altogether rejected in France as an improper food for the worms; and which was rendered infinitely more destructive for these insects by the trees which produced them having been all of them reared in the richest ground in England, namely, in the garden grounds about London, which we know are in a manner yearly loaded with dung.

Here it is proper to remark, that the second crop of leaves which come out upon the mulberry trees after having been stripped of their first leaves for the use of the silk-worm, are not allowed to fall of themselves in autumn. They are gathered for the second time with care, a little before the time they would fall naturally, and are given for food to their sheep, and eaten by them with greediness, and by that means turn out to good account to the farmer. Before the culture of silk was introduced into that part of Languedoc which is near to the mountains of Cevennes; the peasantry over all that neighborhood were miserably poor, as their soil, which is mostly gravel and sand, was incapable of carrying crops of any kind of grain whatever. But as it was found, upon trial, to answer remarkably well for the mulberry tree, the people entered with great alacrity into the culture of silk; and they have succeeded so well in that lucrative branch, that from having been amongst the poorest they are now more at their ease than most of the peasantry of that kingdom.

When I happened to be at Gange, which is within the district above mentioned, and which is remarkable for the manufacture of silk stockings, I was carried to see some mulberry trees, belonging to a farmer in the neighborhood of the village, which were the first that had been introduced into that part of the country. The trees were remarkably large and fine, and little inferior in point of size to our elm trees of the middling sort. The people who obligingly attended me to show me these favorite trees, assured me that a good many of the largest of them brought a return to the farmer's family of a Louis d'or each of them yearly.

From the extension of the culture of silk over all the southern parts of France, there is a great increasing demand yearly for the mulberry leaves; so that they are now become as much an article of commerce as any other vegetable production; the peasants with eagerness buying them up annually with ready money at the proper season for the use of the silk-worms.

This last circumstance has given great encouragement to gentlemen of property to raise extensive plantations of mulberry trees upon their estates; as they bring in a certain and steady revenue, with little trouble or expense to the proprietor, after the trees have once passed the risk of being hurt by cattle. And this improvement is of the more consequence because the grounds that are found to be the fittest for production of the mulberry trees, which afford the best food for the silk worms, being gravel or sand, cannot be employed with any advantage in the raising of corn, more especially where the manures lie at a distance from them.

Grounds of the above description had formerly been in use to be planted with vines; but the returns from these were far from being equal to what is obtained from grounds of the same quality when planted with mulberry trees.—As an instance of this, I shall take the liberty of mentioning the following particulars, which I had from a gentleman, on whose veracity I am certain I could fully depend.

He told me there was a gentleman, a surgeon of Nîmes, in Languedoc, who had a tract of very poor ground in that neighborhood left to him by

his father; which, when it came into his possession, yielded him a rent of three hundred livres, which amounts in our money to twelve guineas and a half. As this gentleman observed that the culture of silk was extending itself rapidly over that part of the country, he planted the whole of his little property with white mulberry trees, the leaves of which, as his plantations advanced, he found he could regularly sell annually for ready money to the people in the town of Nîmes and in the neighborhood, who employed themselves in the culture of silk; and my friend informed me, that these very grounds, after having been only sixteen years planted, gave a return to the proprietor of twelve hundred livres yearly; amounting to fifty guineas of our money. This improvement having been carried on under the eye of the neighboring heritors, several of them pursued the same plan with equal success; and some of them who had grounds of the same quality which had been long planted with vines, actually grubbed up their vineyards, and planted their grounds with the white mulberry; and here let me add, that the mulberry tree is long lived, there being many instances where they have stood perfectly good for above one hundred years.

Here then I must observe, that the greatest care ought to be taken to procure healthy good seed or eggs, because it has been ascertained from repeated experience that the eggs from those houses where the worms were infected with bad air, carries along with it to the worms produced therefrom, the same distempers to which the worms of the preceding year were subject.

The eggs, in order to be properly preserved, should be kept in some dry place, with a free air, not too hot; and that you should avoid keeping them in any vault or cellar under ground; because any kind of damp is found to be destructive to them.

The eggs of the silk-worm have been found to degenerate in the space of five years; hence a change from time to time is judged to be necessary taking care to have the eggs brought from a warmer to a colder, climate. This, however, must be done by degrees, and not carried at once from one extreme to another. For example, eggs brought from the Levant, the isle of Cyprus, or from other countries of the same latitude, ought not to be brought at once into such a cold climate as that of Flanders, or the north of France; but should be first brought into such a climate as that of Provence or Languedoc, from whence, after having remained there for two years, it can be brought with safety into the colder countries.

The first year that the eggs are brought from a warm to a cold climate, you must not expect great success from them; on the contrary, you will find, though the utmost care and attention are given to them, that the greatest part of the worms will die. But still you will be able to save enough to stock yourself sufficiently with eggs, which every succeeding year will be found to answer better as the worms become naturalized to the climate, which can only be brought about gradually; and, indeed, more time will be requisite for this purpose in Britain than in France, as the climate upon the continent is more fixed and steady than with us in England.

In transporting the eggs from one country to

another, especially when this is done by sea, you must order them to be put into a bottle, which ought not to be filled more than half full, that the eggs might not lie too close together, which might run the risk of heating them, and causing them to hatch. The bottle being but half full, leaves sufficient room to the eggs to be tossed upside down, by the motion of the vessel, which keeps them cool and fresh, and hinders them from heating. After putting the eggs into the bottle, let it be carefully corked; a cover of leather put over the cork; and let that be sealed, to prevent any danger of damaging the eggs. When corked and sealed as above, put the bottle into a double case, or box of wood; not only to preserve the eggs from all damp from the sea, or otherways, but also to protect them from too much heat, which would cause them to hatch. If the bottle is too full, the eggs will lie too close upon one another, and will, in that case, heat of themselves, and hatch, and consequently in both cases must be lost.

The eggs that are duly impregnated by the male butterfly are of a gray cindery color, which color they preserve till they are properly prepared for hatching, as after-mentioned. The eggs which are not duly impregnated, are readily to be distinguished from this circumstance, namely, that after having been kept for some time, they always continue to be of a yellow color; and I need scarce add, that all such eggs are good for nothing, and ought, therefore, to be thrown away. There is no distinguishing between good and bad eggs, but by the change of color, after being kept for some time, as above-mentioned.

One ounce of eggs will produce 40,000 worms; and so in proportion, for a larger, or smaller quantity.

These things being premised, I shall now proceed to describe the method I observed to be used in France for hatching the worms. In order to avoid the loss which must necessarily follow, if the mulberry leaves should happen to be destroyed by frost, after you have begun to prepare your eggs, they reckon it advisable to divide them, and prepare them for hatching at two different times, at the distance of ten or twelve days, the one after the other.

The advancement of the season determines the time of preparing your eggs for hatching, as you proceed to that as soon as you observe that there is a prospect of having a sufficient quantity of food for your worms, by the advancement of the leaves of the mulberry. But in order to be properly prepared for this work, you must begin a month before the usual time of hatching; first, to put your eggs in little divisions, from half an ounce to an ounce, which you must place upon a piece of clean white paper, upon plates, for example; and put those plates containing the eggs in a place a little warmer than where you had kept them during the winter: for example, if you have an alcove bed, place them upon the shelf within the alcove. Let them remain in that situation for the first five or six days, after which, you must prepare some little chip boxes, perfectly clean and neat, seven inches long, four inches broad, and four inches high, and cover them on the inside with clean white paper, into which, put the different divisions of your eggs, having a small box for each division, and place these boxes in a basket, upon a stool or chair, at the foot of your bed; making one

of the mattresses of your bed go underneath the basket; and cover the basket on the top, first with some cover of woollen cloth, which pin close over it, and above that place a bed cover above all, so as to keep in the heat communicated by the mattresses to the eggs; in which situation, let them remain for six days longer; after which increase the heat to 14 degrees of Reaumur's thermometer,* preserving that heat equal, night and day, by means of a little fire in some corner of the room at a distance from the bed.

In the morning when you get up, put a heater of one kind or other: for example, a tin bottle with hot water, or a foot stove, into your bed between the sheets, and proportion that heat so as to equal the heat you give to the bed, when you lie in it yourself; keeping up the same heat as nearly as you can, until you go to bed again yourself in the evening.

Having kept them in this situation for eight or nine days, you must then put your different divisions of eggs into little pieces of old linen cloth, which must be washed thoroughly clean for that purpose, as the least dirtiness in the cloth would prove prejudicial to the eggs; each piece of cloth should be of the size of a foot square: turn up the ends of the piece of cloth and tie them with a bit of thread, as near to the top or end as possible; by means of which the eggs will lie loose, and can be shook, and turned from time to time, without untying the knot: replace these packets in the basket, and cover them up as before, turning and shaking the seed in the packets three or four times a day that it may receive the heat equally.

On putting the eggs into these packets, increase the heat to 14½ degrees of the thermometer, and keep up that heat night and day as equally as possible; for which purpose, have a couple of thermometers in your room for your direction. After the eggs have remained in the little packets for three or four days, increase the heat to 15 degrees; and in four days more, if the weather seems settled, and very promising, increase the heat gradually to 16 degrees, visiting and turning the eggs from time to time as before.

When the eggs begin to turn white, and the mulberry trees are so far advanced as to be out of danger from cold winds, or slight degrees of frost, increase the heat gradually to 17½ degrees, or 18 degrees at most, to quicken the hatching of your eggs, and to make the worms come out as nearly at the same time as possible. But never increase the heat to more than 18 degrees, because a greater heat never fails to push the worms too fast, and to render them red at their first coming out.

When the worms are red at their first coming out it is a sign the eggs have either been bad, or ill kept over winter, or overheated; that is, too much forced when laid to hatch. Worms of this color are good for nothing, and are therefore to be thrown away, to avoid the expense of feeding them, since they will never produce cocoons.

When the worms are entirely black, upon their first appearance, it is a sign of their having been perfectly well managed, which gives great hopes of success.

During the third age make use of the leaves

* Or about 59 degrees of Fahrenheit.

of such trees as have been planted out in the field, but reserve the leaves of your oldest trees for the fourth age, as these last leaves are reckoned the best for the worms when come to their maturity.

Be attentive to cleaning away the litter as before directed, which, during the third age, should be done at least four or five times; and take care to clear away, from time to time, all dead worms the moment you observe them: and to throw aside also regularly all such worms as appear to be diseased, to prevent them from infecting the rest, which will happen if this article is not pursued with the strictest attention. All the worms which you observe to grow of a yellow color, and to have their skin shining, are strongly diseased, and must be immediately thrown away, for fear of infecting the sound ones. These diseased worms sometimes void a yellow liquid at the tail, and it often also bursts out at other places of their bodies. These must always be attentively removed the moment they are observed; but it becomes more essentially necessary before the worms enter into their third sickness, because at this time they become most dangerous, by voiding the yellow liquid above mentioned, which is poisonous to the worms, and exceedingly contagious; insomuch, that every worm that happens to touch this liquid is sure to be infected with the same distemper, which has hitherto been found to be incurable.

Upon the article of hatching the worms, it has been recommended to save the production of the first four days, as I observed this to be the general practice in France: but I must mention, that having met with a French gentleman at Montauban, who I understood had dedicated much of his attention to the culture of silk, and in which I was assured he had been particularly successful, I took the liberty, with a view to gain information, to request of him to favor me with an account of his method of management, with which he politely complied. By the account I received from him, I found the material difference betwixt this gentleman's management and the general practice consisted in the following particulars. He told me, that having long observed that the worms which were first hatched turned out always to be more healthy and vigorous than those which were later in coming out, he had for this reason adopted the following plan, which he had then followed for several years, and to which, in a great measure, he attributed his success.

If his intention was to raise a quantity of worms equal to two ounces of eggs, his practice was to put two ounces and a half of eggs to germinate, and to save no more than the production of the three first days; throwing away all the rest. He likewise made it a rule upon their passing through their different maladies, to take only the forward worms, throwing away regularly all those which remain long in getting over their maladies, and he gave the following reason for his continuing to follow this plan; namely, that from many years' experience, he said he had found, that those worms which are hatched after the third day always turn out to be weakly, and are tedious in all their operations. For the same reason he rejected all those worms which linger in getting over their maladies, which he said was owing to their weakness, or to their being infected in some measure with some disease, which generally carried them

off before they could make their cocoons; or if they did get the length to make their cocoons, these last he maintained were so light, that they were not equal in value to the expense of the leaves which these worms will eat during their *grande fraize*. At getting over their different maladies, he saved only such as came away the first two days, throwing away all that were not ready at the close of the second day. From what observations I had myself made upon the silkworm I thought this gentleman had a great deal of reason upon his side; but as, in every thing in relation to this culture, I uniformly made it a rule to satisfy my mind fully by experiment, I firmly resolved to submit his plan to that test. I was, however, disappointed in fulfilling my intention in that respect, by my having been obliged to return to Britain upon business before the next season of the silk culture came round. At the same time as I still continue to regard this article as a matter of great importance to that culture, I would humbly advise that it should be fully canvassed by experiment.

In taking the cocoons off the brush-wood, pick them off carefully, especially if there are any dead worms amongst them, which presently corrupt; because such of the cocoons as touch these dead worms are spoiled by them, as they contract by that touch gluiness from the dead worms, which hinders the silk from winding off properly from the cocoon. The best manner to know the good from the bad cocoons, is to press them at the two ends with your fingers. If they resist well that pressure, and appear hard and firm betwixt your fingers, the cocoons are certainly good.

Though they appear firm upon pressing their sides with your fingers, they may still not be entirely good; the pressure at the two ends being of all others the best manner of knowing the good ones.

ON DIGGING POTATOES.

From the Boston Cultivator.

Potatoes should be suffered to lie in the ground until they are fully ripe. There is nearly as much difference between a ripe potato and an unripe one as between a ripe apple and an unripe one. Unripe potatoes are uniformly watery, and are some of the most indigestible materials that we meet with. This is so much the case that the stomach has been often known to reject this article while it retained all the other materials admitted at the same time.

When we have not too much work for the month of October, it is more prudent to let our late potatoes lie until that time than to dig them earlier—and when we dig them if they are not wet we should never let them lie in the sun or in the air. Any loam reasonably moist may be allowed to adhere to them while they lie in the cellar, and we need not fear they will heat or rot as turnips will when put in a great heap where the air cannot have access to them. Turnips are of a nature different from potatoes, they grow principally above ground, while all potatoes that are worth saving grow wholly under ground. We

were once taught to dig our potatoes in the morning, throw them between the rows, and let them dry through most of the day—then to tilt them from the cart into the door yard to beat off all the dirt that might adhere to them. But experience has taught us that this is a branch of fancy farming, and will never answer for practical men.

When we lived on the Kennebec river and sent up loads of potatoes to the Boston market, we often wondered that our Boston friends were not as fond of the Kennebec potato as ourselves—but on attempting to eat in Boston some of the same potatoes we had sent there we soon perceived the great difference between a Kennebec potato in Boston and a Kennebec potato at home. Our potatoes had been too much exposed to the air, and though they had not turned green, as they will do when exposed in the sun, they were spoiled by exposure.

Our Kennebec and Penobscot friends should pack up in tight casks all potatoes sent off to customers whom they expect to trade with a second time—and if perfectly tight casks cannot be obtained, loam or sand may be filled into flour barrels with the potatoes, and the cost of transportation to Boston by water will not be increased by the filling.

A part of the labor of harvesting potatoes is severe and requires a strong arm; the soil lies heavy about them and the hand hoe must be used with much more vigor than is required in tilling the ground, in order to disengage them from their bed. A plough, constructed in such a manner as not to cut the potato would save a great deal of hard labor. The plough should have a dull coulter which should slope back at an angle of forty-five degrees; and it might also have a double mould board. This plough would loosen up all the earth about the potatoes, in land free from stones and stumps, and most of the potatoes would lie on the surface—the remainder would soon be discovered by the prong hoe.

Some ploughs of this description—or near it—were here exhibited at the fair last season. We hope some of our ingenious farmers who raise many potatoes for market will try a plough of this description and let us know how it works.

MODE OF HARVESTING BUCKWHEAT.

From the Cultivator.

Mr. E. Freeman, of Framingham, has raised a beautiful field of buckwheat on some of his lightest, poorest land. In April he sowed this land with a bushel of rye to the acre, and in the last of June he buried all this rye with his plough, using a foot in the beam, and a cross bar at the bottom of the foot to lay the rye straw flat, so that it might be buried in the furrow. He sowed buckwheat, one bushel to the acre, and it was his intention to plough in the buckwheat straw in August as he had done the rye, but when he saw what a harvest of buckwheat he might have, he hesitated about turning it into manure. On seeing it, our advice was to save the grain, and keep the same field for buckwheat for next summer, as the land is not suitable for large crops of grass, being too light and porous to hold either moisture or manure.

Mr. F. concluded to take that course, and he began to harvest his wheat by mowing it with a common scythe. Afterwards he engaged a man to cut it with a grain cradle—it was thus laid in gavels like rye or oats—without suffering it to lie long in the gavel, he raked it into heaps of the size of common bundles, and then—*without binding*—he set these bundles on end to let the tops dry, and the beards of the grain held the whole bundle together sufficiently strong to keep the grain from the ground.

It was Mr. Freeman's calculation to let these bundles stand two or three days, then cart them and thrash out the grain immediately, before it should gather any moisture from the straw. And we are inclined to think this is the best mode of harvesting this valuable grain. If we mow it with a common scythe, we must rake over the whole ground, and the grain shells out so easily, we lose some every time we stir it—these bundles stand up so well they need not be moved or stirred until they are dry enough to be carted, and they need to be moved but once. No binding or unbinding is necessary, and the expense of harvesting is not half so great as the harvesting of common wheat. Mr. Freeman will probably have thirty bushels of buckwheat to the acre.

POTATO GROUND FOR NEXT SEASON.

From the Cultivator.

The potato has become an indispensable article for the table, and no pains should be spared to grow the article in the best manner, and at as little cost as may be. And the very unequal quantities which we often see harvested in fields that are to all appearance equally rich, demands some of our attention to inquire into the cause of this difference. All will agree that soils naturally light, or made so by means of manures, furnish the best bed for the growth of the potato. Cultivators take different methods to produce this lightness in the soil, but most of them who have no new ground, (which always lies lighter than old,) to plant with potatoes, place a shovel full or a fork full of manure in the hill with the seed potatoes, and in case of a dry summer the harvest will often prove less than if no manure were used! And then the land is scarcely any better by the application, for the next season.

You may generally have vines in abundance by placing manure in the hill, but good bottoms are more important than large tops, and our calculations should be made accordingly. Now we find that no soil will lie so light through the summer as green sward will—but if the sward is turned in the spring, and is then planted with potatoes, it does not become mellow in season to give them a good bed—it is also in most cases more dry than it should be for this article. We propose to our friends who never tried the experiment, to turn over some green sward in October, before all the grass is fed off, and see if they will not have a better bed for their potatoes than they can otherwise make—if straw or old meadow hay is ploughed in, it will not vitiate the soil, and it may help the crops. We once tried this experiment—we ploughed our ground about the middle of October, and in the spring we did nothing but

harrow it well—planted our seed—threw a spoonful of plaster on each hill—and hoed our potatoes once; and without hilling up more than half an inch—without any manure we raised the largest crop of potatoes that we ever harvested. The land was more light through the summer than we could make it by means of manure.

CUTTING AND PREPARING HEMP FOR MARKET—WITH ITS PRICES FOR THE LAST EIGHT YEARS.

From the Southern Cultivator.

Dear Sir :—Some remarks having been made in a former No. of your paper, in regard to the growing, or primarily, to cutting of hemp, I feel at liberty to extend those remarks, and say something about the time when hemp should be cut, and how and when it should be taken up, stacked, &c.

Observation seems to warrant the conclusion that well grown hemp should be cut and fully matured, and short grown, low, fine or poor land hemp should be cut before maturity. It is a fact clearly demonstrated to all common sense, that all vegetation, whether plants, roots, trees, or shrubs, as long as they are in a thrifty, growing condition, have not arrived to maturity or fulness—so of hemp. We should let hemp that is full grown, usual size and length, remain undisturbed until it has fully matured—it has then received all the nourishment and strength that nature gives, and undoubtedly should be cut at that period.

Short or poor land hemp, should not be permitted to remain to maturity. It is a well attested fact that such hemp is usually more difficult to water and get clean, than better grown hemp. The reason seems to be founded on this fact—the stalks are much smaller and more compact generally, and the lint of a much finer texture, closer grain, and of course better protected against the watering showers and dews. Now for the reason why it should be cut before maturity: I presume no one will doubt for a moment, that when matured, the sap has ceased to flow; that being the case, there is greater affinity for the stalk than before, and less susceptibility of an early maturity. When you cut before the sap has ceased to flow, you preclude that affinity for the stalk that it would otherwise have, and leave it susceptible of an early maturity. It is well understood that timber cut when the sap is flowing, will not endure as long as when otherwise cut. This I presume proves the point, that when cut before maturity it is sooner watered and much less labor required to clean it. The reason why the same argument will not apply profitably to well grown hemp, is to be found in the fact that when matured it carries more weight, while it is easier watered, from the fact of the stalks being more porous, and presenting at the same time more surface to the contracting influence of wet and cold—saturation and freezing—bursting loose from the stalk, smiling at the hope of an approximating deliverance from such low grounds, and claiming a rank among the dignitaries of the field.

When your hemp is cut, let it remain on the ground until it gets a rain on it.—There are several advantages resulting from this course. First,

you get rid of the leaves that are found to be troublesome, (if you attempt to stack your hemp without first taking them off.) Next, it leaves your hemp in a condition to water much sooner than otherwise, (losing some chemical property.) When soon watered, it cleans easier—in fact you may lay it down as a settled maxim, that when your hemp is hard to water, that it will be difficult to clean; hence the necessity of the utmost precaution and vigilance at this stage of your crop.

Next in order of saving your crop comes stacking. There are several reasons for this. Hemp when cut has nothing to lose; its troublesome roots are improving your soil, and what you have left will be wanted to protect against the beam of a summer's sun, and ravages of an autumnal storm. To do this, you must put it up in large stacks, upon the same principle you would wheat, rye or flax, excepting you keep the sides of your stack perpendicular until you get it high enough, then let your last course on the top extend over about 12 or 14 inches, to give eave that the ends of your hemp may be protected against the dripping—protection at this time being the order of the day—cap well, and all will be well.

As early in the fall as the heavy frosts and frequent rains commence, you may spread out your hemp; when watered sufficiently, take up, break out, and send to market, and my word for it you will carry home a heavier purse than either cotton or corn will award you. I have been at some pains to ascertain the average price of hemp in Middle Tennessee the last eight or nine years. I find that from the most authentic sources compared, we have the average of \$6 25 per hundred pounds for the last eight years in Maury county; while that of Kentucky is reckoned at \$5. In Maury county, in the year 1833, hemp was worth \$5 per hundred pounds; 1834, \$5; 1835, \$9; 1836, \$7; 1837, \$6.50; 1838, \$6; 1839, \$5.50; in 1840, \$6—thus giving the mean or average price of \$6 25. From the best sources, I learn that cotton grown in Middle Tennessee, has, since perhaps as far back as 1799, been gradually decreasing—commanding in that year an average of 44 cents. In 1840, 6½ cents. I admit that it is owing perhaps to circumstances with which we are surrounded at the present time, that cotton commands such a pitiful price, (circumstances which will perhaps not occur again in half a century;) yet for the last twenty years, the average price has been about 9 cents for Tennessee cotton at the gin. "The average annual product of lands in Middle Tennessee is believed to approximate to 200 lbs. clean cotton to the acre." Thus taking the average product of one acre of cotton, we have 200 lbs. at 9 cts.—\$18; deduct for 15 days' labor, which amount is thought to be a fair average on one acre, at 50 cts. per day—we have the sum of \$10.50 as profit, or proceeds. Taking hemp, we find that a fair average annual product to be about 500 lbs. clean hemp to the acre—which at \$6.25, gives us the sum of \$31.25—deduct for labor 10 days, and superior land \$2—we have the sum of \$24.25 proceeds. Showing a balance in favor of hemp of \$13.75. Exactness in these calculations is not to be expected, but a fair calculation has been aimed at. G.

Columbia Sept. 3, 1840.

RAIL-ROADS IN THE UNITED STATES.

The Journal of the Franklin Institute contains a detailed account of the rail-roads in a number of the states, with the length, costs, &c., from the tables of which the National Gazette gives the following: In Pennsylvania, the number of rail-roads are thirty-six, the number of miles opened five hundred and seventy-six and a half, the total length of road eight hundred and fifty miles and a quarter, and the amount already expended \$15,640,450. In Virginia, the Carolinas, Georgia and Florida, there are twenty-three roads, and nine hundred and ninety-four miles opened; total length, sixteen hundred and seventy-five miles and a half. Amount expended, \$18,442,000. In Alabama, Louisiana, Mississippi, Tennessee and Kentucky, there are twenty-seven roads, one hundred and ninety-five miles in operation; total length of roads, eleven hundred and forty-eight miles and a quarter. Already expended, \$9,621,000. In Ohio, Indiana, Michigan and Illinois there are twenty-nine roads, one hundred and ninety-six miles in operation; total length of roads, two thousand eight hundred and twenty-one miles and a half. Amount expended, \$5,523,640.

WILD DOGS OF VAN DIEMEN'S LAND.

From the Penny Magazine.

The annoyance and danger occasioned by the wild dogs in Van Diemen's Land is still a subject of great complaint in the papers of that colony; and the most active exertions hitherto used, seem to have had little effect in abating the nuisance. The dogs appear rather to increase in number and boldness. A case is mentioned, in which a person named Akerley was assaulted by thirteen of these animals, and would probably have been killed if he had not contrived to get up into a tree. The means hitherto employed to eradicate them do not seem to have been commensurate with the growth of the evil. A society has been established at Gaddesden, near Campbell Town, to effect their destruction; and the house of the chairman exhibits a collection of skins, to the number of a hundred, of dogs that have been killed, of almost all kinds, from the shepherd dog to the Newfoundland. It is thought that unless the most decided measures are taken, it will be impossible to pasture sheep in the colony. The dogs bring forth six or eight young at a litter, and commence breeding at one year old, while the sheep brings forth only one, and does not commence breeding until two years of age.—The ultimate and discouraging prospect which this opens, is brought nearer by the daily defection of the domestic dogs of the colony to the wild ones. "At the remote stock-hunts," says a recent paper, "a free man keeps as many dogs as he pleases; frequently six or eight are kept; these dogs provide for themselves, and continually make off to the wild packs. All remonstrance is received with a smile of contempt, and returned by insult; and until such people are strictly prohibited from keeping dogs in the pastoral districts under heavy penalties, matters are not likely to mend: indeed it is to be feared that the evil is fixed for ever—that it has been too long neglected, and is now past remedy." We are

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too well assured of the resources and power of civilized men to partake of these apprehensions; but any delay now in organizing a plan of simultaneous operation against the dogs, is likely to render their future extirpation a matter of great and increasing difficulty and expense. Meanwhile, at this distance from the spot, it is interesting to watch the various aspects in which this remarkable state of things appears, and to observe the different measures which it may be necessary to adopt against the canine depredators. Since writing the above, we find that an "Act of Council" has been issued for the purpose of restraining the increase of dogs. All dogs are to be registered; and none are to be left at large except in Hobart town and Launceston. Unregistered dogs, or dogs found at large contrary to this order, are to be killed. The persons killing them are to be paid from 5s. to 40s. each, out of a fund formed by the registration fees.—The registration fee for a watch-dog kept chained, or a sheep-dog, is 2s. 6d.; all other dogs 10s. or if females double the respective amounts. The local newspapers are not very sanguine in expectations of good from this measure.

HEMP.

From the Southern Cultivator.

The growing of hemp is becoming of more importance annually to the farmers of Middle Tennessee, and especially to the citizens of Maury, Giles, and parts of Williamson and Davidson counties. Many farmers have been experimenting in these counties, for several years on a small scale; and so far as I have knowledge, they have uniformly resulted in the full conviction of the practicability of its being a crop every way adapted to the climate and soil, that pays the farmer larger annual profit than either cotton or the rearing of stock; whilst the growth and management of hemp, in those counties are at least a half-century behind the growth of the same article 250 miles north of us, among the all-enterprising and industrious citizens of the middle and upper counties of far-famed Kentucky. And I think that it is a duty we owe to our county, country and state, (having the soil and laborers in abundance,) to awaken to the acknowledged importance of the cultivation of hemp. The pecuniary and embarrassed condition of our once prosperous and happy country demands that the energy, industry, and ingenuity of every man should be brought into action to improve and circulate widely every item of our knowledge of the growth of every article that can be grown in our country, for consumption or export, (that pays well for labor,) that we may as much as possible conceal our large importing debts, and stand out boldly against all the reverses of the times.

The cultivation of hemp, in the counties above mentioned, should not be second in importance to any. The advantages of soil and climate, our contiguity to the cotton growing states, give us an advantage over all other hemp growing districts, (Kentucky being the nearest) of 25 per cent. at least—having 250 miles in advance of the best bagging and rope market in the United States, to say nothing of the comparative low price of our

land, and consequently less capital invested. These conveniences to market will always give us a decided advantage over our neighbor states, in proportion to the cost of transportation from the hemp growing districts. Having an acquaintance with the soil suitable to the growth of this article—hemp, I feel it a duty I owe to my fellow citizens to invest my knowledge as common stock. I shall make only some general remarks in regard to the capacity of the soil of the counties I have named for growing hemp, believing that those who grow the article are not in serious errors in regard to the quality of the soil best adapted, or the preparation of it for the reception of the seed—but after it has matured, or in other words, ready for pulling.

It is the practice of the hemp grower in Kentucky—the principal hemp growing state in the union—to cut their hemp instead of pulling it up by the roots. After having experimented for 20 years, taxing their ingenuity for the invention of some implement by which the labor of pulling, breaking, and cleaning should be reduced, it now seems to be a point settled with them to cut their hemp with an improved hook, called the drag hook, thereby reducing the labor, and making it convenient for every man to raise hemp however small his force. It is thought by a very respectable portion of the hemp growers in this country, that the advantageous management of this article is confined to stout, able-bodied men. This opinion was also held by the Kentuckians a few years since. But it is not now so much so. The cutting of hemp lessens the labor. First, for cutting, you can, if you have a good season for sowing, put your seed in with a large harrow—it leaving the ground smooth which should never be omitted; for pulling, you must plough your ground and leave it furrowed, if you wish it to pull easy—season or no season—which requires more time and labor.

Secondly—To cut it does not require the same amount of strength to perform a given quantity of labor, unless it is on very fresh land and quite loose soil—and in that case you make by cutting, because the weight and troublesome part of the stalk is cut off and left to enrich the soil—which part prevents also the curing and rotting so readily.

When cut, it comes in half the time, stacks with half the labor, can be spread more regular and even with less labor, and does not require the same quantity of rain and dew to rot it. When cut, the pores or hollow of every stalk, however small, are left exposed to the first dews and rains, and very often the lint on the stalk is dry and the stalk decomposing rapidly, from the fact of its having become saturated by means of the exposition of the hollow of the stalks. The stalk loses its affinity for the lint—it is yet bright and glossy, and but little injured by exposure to the weather. When you go to break your hemp, you are not troubled with those half rotted roots which are consequently attached to every stalk that is pulled and in getting off of which you lose more time, and indeed more lint, than you lose by cutting some two or three inches above the ground—which should never be the case, but close to the surface; hence the reason why the Kentuckians break and clean so much per day—200 lbs. being quite a common day's work, where they are in the habit of cutting! while half that number of pounds, in our country, is considered a good day's

work, and the article not so good or saleable as that of our neighbors. In conclusion, I need only appeal to the judgment and experience of the two countries—Kentucky and Tennessee—to warrant all I have said on these matters.

There is yet in the minds of many of our fellow-citizens an objection—a seeming objection—to raising hemp, which I would beg leave to offer a few remarks upon—that is, “we would raise hemp if we could get a market for it.” It is necessary that we should profit some by the experience of others. If the Kentuckian and Russian growers had urged this same objection, they would yet have been in a wilderness; but their industry and intelligence outstripped all opposition as soon as they found they had the soil and the climate suitable for growing hemp. And if we would make the growing of hemp of importance among us and make a good article and in sufficient quantity, manufactories would soon spring up—the inducements would warrant a preparation for it; as it is, manufacturers are afraid, with perhaps one year plenty of the hemp and the next not any. If our farmers would interest themselves as much in the growth and management of hemp as they do in the rearing fine horses and hogs, I would insure them equal advantages of product and market with every other hemp growing state in this union.

A specimen of the most improved hemp hook can be seen at the office of the Cultivator. I would recommend the use of it by all who feel an interest in these matters.

Respectfully, GEO. W. MCQUIDDY.

WOBURN HOGS.

Extract from a letter from Dr. Samuel D. Martin, of Kentucky, to the Editor of the Southern Cultivator, dated—

Colbyville, Aug. 18, 1840.

The Woburn hogs are of great length, large size round the body, legs of medium length, (the hind legs generally a little longer than fore legs,) well tapered down to the foot—stand well and straight upon the leg and foot. The head is small for the size of the hog, with small ears, generally erect, though many of them have their ears to drop a little. The prevailing color is spotted with white and black; many are brown and black. They come early to maturity, fatten easily; travel well, are productive in pigs if not kept too fat—gentle and well disposed, not disposed to be restless, or to get out of enclosures where they are put. I have never known a Woburn sow to eat her pigs.

I could give you a great number of extraordinary weights; but where great weights have been obtained, it has generally been by extra keep and attention, and such instances are calculated to deceive those who read them. The heaviest hog I have had of this breed, was a boar that took the premium at Lexington, in 1837, that weighed 600 lbs. at fifteen months old. He had three months extra keep. He died at sixteen months old, and I believe he would have weighed 600 lbs., having gained about 100 lbs. a month for the two last months of his life. I have known but one sow killed, and she weighed net meat, 464 lbs.

I killed last fall about fifteen thousand weight of pork, most of which were pigs from six to eight months old. Two that were pigged the 23d of April, were killed on the 12th December, and weighed 187 and 224 lbs. net meat. These two were from a litter of ten, that the sow had raised, eight of which had been selected for breeders. My June pigs, killed at the same time, averaged 124 lbs. These are not given as extraordinary weights, but as samples of what this stock will do in the hands of any body that will take proper care of them. Enclosed you have a plate of one of my Woburn boars, which was taken when he was nine months old. This plate will serve to give a better idea of the formation of the Woburn hog than I could by description. Their bodies to the eye appear to be perfectly round; but measurement shows they are rather deeper from the back to the breast.

Besides the Woburn, I have the Berkshire, (black and white,) the Neapolitan, the Lancashire, the Irish, and have had most of the popular breeds. I have made many experiments to test the relative value of the different breeds, some of which have been detailed in the Franklin Farmer. My experiments have not been sufficiently varied and exact, to prove all that I wished to know concerning them, but as far as they have gone they have been decidedly in favor of the Woburn. I have also proposed, in the Franklin Farmer, making a more thorough test of the different hogs. An experiment was lately made in Jessamine county, Ky., by Isaac and William Barclay. They fed for thirty days, a Woburn and a Berkshire boar.—The Berkshire gained fifty-seven pounds, and the Woburn one hundred and seven pounds.

I have Berkshires of Haws and Lossing's importation, a description of which has been published in many of the agricultural papers.

I sent last year an order to England for four of the best hogs that could be procured, and my agent sent me the White Berkshire, the Neapolitan, the Lancashire, and the big white China. My white *improved Berkshire* was purchased at a price that would have purchased half a dozen black Berkshires. He has all the good qualities of the best of the black ones, and a size, and softness in feeling, which the black ones lack. His value must depend upon his breeding, and I am willing for time and experience to test this matter.

Yours, very respectfully,

SAMUEL D. MARTIN.

OBSERVATIONS ON THE EXCRETORY POWERS OF PLANTS, &c.

From the British Farmers' Magazine.

The lately discovered doctrine of the excretory powers of the roots of plants, although it was rather startling to us, and slowly received at first, is now beginning to be embraced by the generality of scientific men. The doctrine being first adopted and promulgated by several leading men, about the same time in England as well as on the continent, gained for it a ready acceptance with many, who, however, had some difficulty in explaining and proving what they professed to believe. That the soil immediately in contact with the roots and other parts of the plant which grows in it, must

receive some kind of taint, either by exudation, respiration, or other mode of discharge of its fluids, is perfectly feasible; and that this taint is appreciable by our senses, both of sight and scent, is undeniable. But whether this taint or discharge from the plant be *poisonous*, or only *useless* to plants of the same kind which succeed, is the question not yet clearly decided. Objectors insist that it is not what is *left* that is deleterious, but what is *taken away* which renders the soil less suitable to the second crop of the same kind. Every different species of plant, say they, selects its own peculiar kind of food, and therefore the second cannot find so much as the first, unless the exhausted plot be replenished with that of which it has been deprived. But the abettors of the exudation notion, say this is impossible; that no replenishment of even the richest dress will operate so as to make the second as good as the first crop. This is, perhaps, carrying the idea of excremental poisoning too far; because a farm may be so exhausted under a *regular rotation* of cropping, as to be at last unfit to bear any kind of crop until again visited by the dung cart. We often see in cottage gardens onions and cabbages repeatedly grown on the same spot, without any material falling off, provided the annual application of ashes and other sweepings about the house are bestowed to assist the crop.

It is quite possible, however, that one species of plant may be not only unhurt by the exuvia of another, but even thrive in it, as beans and wheat are known to do, alternating for many consecutive years. And, moreover, as beans, drilled and properly labored by horse and hand hoes, are a cleansing crop, and if the drills of this year were to occupy the intervals of those of the last, it might be possible, as Tull used to say, to grow beans every year upon the same field; but this, for many reasons, would not be eligible, even if practicable.

But some of those who strenuously support the theory of Professor De Candolle, relative to the injurious ejectments of previous crops, not only insist on the validity of the professor's opinion, but maintain that it is consistent with a fixed law of nature, namely, that no plant is destined by nature to occupy constantly the same station. That they are constitutionally endowed with powers or tendencies by which they desert or fly from the place of their birth; as if by a kind of preception they knew that their parents had devoured all the food which they would require for themselves.

We have many instances of the progeny forsaking the mother; some seeds have parachute wings to fly away with; others are contained in seed vessels, which when acted upon by the heat of the sun, burst with such elastic force as to scatter the seeds to a considerable distance around. By many other means are seeds dispersed: by winds, by currents of water, by birds and other animals. But besides seeds, plants have other modes of increase or extension: witness the numerous offsets and suckers produced by many different sorts of plants, and all these take divergent directions, so that they should not rob the parent or be starved themselves. The strawberry plant is a familiar example of how far the living progeny depart from the mother's station before they fix themselves in the ground. To these instances a hundred others might be adduced; all which go to prove that plants are constitutionally inclined to a change of place. Trees, indeed, are fixed to one spot; but they are ever finding

fresh pasture by the extension of their leading roots, as is the case with all other perennial plants.

But, after all, the question recurs—is this diverging tendency a natural law of vegetation, or is it because antecedent production exhausts or poisons the soil, so as to render it unfit for the purposes of subsequent production?

We know that newly broken up land, whatever its quality may be, is always more suitable to any crop than that of the same quality which has been long cultivated; showing that there is a *something* in maiden soil which is fugitive. What that *something* is, has never been discovered by practical men, nor has it been investigated by the chemist, though an object well worth the researches of science.

That the fertility of exhausted land may be renewed by additions of manure, is well known; and it seems that the dress restores that which has been abstracted by the previous crops; or, at least supplies a substitute. On the knowledge of this fact all our best systems of agriculture are founded; and whether land be exhausted or poisoned by previous cropping can make no difference in the culture, so that the rules of rotation, as established by long experience, are strictly attended to, and no cross-cropping pursued, unless for some manifest prospective advantage.

That a change of soil, and even a *change of air*, are beneficial to all kinds of terrestrial plants, are well confirmed facts; and nothing conduces so much to the advantage of the farmer as a frequent change of seed. Now, how a change of soil without its being of better quality, and especially, how a *change of air*, without reference to its temperature, can be so exciting and congenial to foreign or strange plants, is one of those mysteries in cultivation which we cannot readily fathom. It must be observed, however, that such effects are only seen between the fortieth and sixtieth parallels of latitude; because beyond those bounds an interchange would be too extreme; though there are some exceptions to this rule, for the Mazagan beans of Egypt do well in this country, and some native plants of Siberia do equally well in Britain. But the farmer's range in making such changes is confined to the seed of corn, grasses, potatoes, &c.; and next to obtaining clean seed of the *best varieties*, most suitable for his own land, is the procuring them from the most distant parts of the kingdom, or at least from some neighboring country.

REPORTING EXPERIMENTS WITH ARTIFICIAL MANURES.

From the British Farmers' Magazine.

In all our agricultural publications now issuing from the press, we see many accounts of experiments made for ascertaining the value of certain substances recommended as manures, either for top-dressing or ploughing in. Some of these accounts are elaborately, and, no doubt, faithfully written; and sometimes favorable, or, as it may happen, unfavorable. Sometimes, too, we are told of the same material having contrary effects on land of precisely the same character, especially if situated in distant parts of the kingdom. Now, these discrepancies may often arise from ignorance or want of consideration of the peculiar effect or action of the material employed.

Besides the various substances which have been used as manures from time immemorial, there are others, chiefly minerals, which are brought into use with various success. The reports of such trials are not always uniform; and defective in so far as the character of the weather or season following the application is omitted to be stated. In my own practice I have used soot extensively for top-dressing wheat, and have harrowed and rolled it in; but if a dry spring and summer followed, the soot was of no service. I have used chalk and lime as dressings for light gravelly land; but if a wet season succeeded, little or no immediate effect was observable. The same result followed the application of salt, on the same description of land, under the like circumstances of season. And the reason for the non-efficiency of these three last named substances was perfectly obvious: all three are ready absorbents of water from the air, and in dry seasons are eminently useful to growing crops; whereas, in a showery time, the crops need no such assistance.

Saltpetre and nitrate of soda are at present fashionable top-dressings; and those best acquainted with these substances affirm that they are often injudiciously used. On wet tenacious land they can never be so efficacious as on dry sandy or gravelly soils; nor in wet seasons so much as they certainly must be in dry. If I be not mistaken in attributing to them such effects, they will always be considered as doubtful fertilizers; because they must be used before it can be ascertained, except by conjecture, what sort of season is to follow.

Mr. Cuthbert Johnson observes, that "the agricultural uses of saltpetre have not been examined so carefully or generally as they ought to have been;" and G. Kimberley, Esq., of Trotworth, "regrets that it has been hastily adopted, without reference, in many cases, to season, soil, climate or quantity; and as a few fortunate experiments have started into a fashion the use of these articles, so one or two unseasonable or improper applications have at once condemned them to neglect and oblivion."

Such reports show decidedly how necessary it is to know correctly the effects of those artificial manures; whether as the food of plants, or improvers of the staple; whether as exciters of vegetation or solvents of the nutritive matters already in the soil; and also under what circumstances of weather or season they are most active, or altogether neutral. These are questions for the agricultural chemist to prosecute; so that no farmer need work in the twilight, or be in doubt concerning the direct effects of any manure which comes recommended from competent authorities.

And in all future reports of experiments made with any of those uncommon articles of manure, the reporter should not omit to state what kind of weather has prevailed during the experiments; for the effects, especially of saline substances, are very much determined by the state of the weather.

J. MAIN.

[Our respected correspondent is right. Much of the success or otherwise of these, and many other manures we could name, must depend on peculiar circumstances of soil and season. We have heard saltpetre abused one year, and highly extolled in another; although tried on the same soil, the same description of crop, and by the same person.—ED.]

From the South Carolina Planter.

A GOOD WAY TO KEEP SWEET POTATOES IN WARM WEATHER.

Florida, 26th August, 1940.

I now have sweet potatoes, (yams,) of last year's growth, on my table every day, although the new crop has been fit to use here for more than a month. This is the second year of my success in keeping them through the summer, after a great many previous experiments and failures, and others may like to know and try the plan for themselves. Here it is.

1. I made a plentiful crop.

2. My potatoes were dug and put up in mild, open weather, as soon as the vines were singed by frost.

3. The eating potatoes were carefully picked over, and all that were cut or bruised, were put by themselves for early use.

4. They were then put up in heaps of 80 or 100 bushels each, on ground a little sloping. The heaps were covered first with a layer of dry corn stalks, and these with a good coat of earth, taken from the margin of the heaps. By this means the earth on which the heaps rested, was left 10 or 12 inches higher than that adjoining, besides cutting trenches to carry off the rain water. There were no air-holes or vents left at the top. The earth used in covering is a sandy loam. These potato banks were protected from rain by slight clap-board shelters.

5. In the spring, at the time of planting slips, my eating potatoes were also taken out of the banks. The decay up to that time was about 15 per cent. The potatoes were generally sprouted. Those that were entirely sound were selected, the sprouts carefully removed, the potatoes wiped dry, but not exposed to the sun, and removed to a log house, on a dry plank floor, where they remained for use, without any further attention. The loss from decay since they were put in the house, has been equal to about 10 per cent more. I think the loss would have been less, if there had been more room to spread out the potatoes. A gin-house would be a fine place to keep them in during the warm weather. For I have found that Irish potatoes can be kept there longer and better than in any other place I have tried.

As to the best method of keeping sweet potatoes in winter the following story may direct your attention to a quarter, from which you may obtain some useful information.

In the fall of 1833, I called at the house of J. G. near the Watree canal. He had just put up his potato crop—chiefly in a house of the following construction. It had a double log wall, and the space between the walls (15 or 18 inches,) was filled with earth. The top or loft was floored with stout puncheons, and these covered over with clay 10 or 12 inches thick—above which there was a common board roof. The ground floor was sunk about two feet below the surface of the earth. The area of the house was about 8 feet wide, 8 feet high, and 16 feet long, which he computed to hold 800 bushels. It was entirely filled with potatoes.

What struck me most, was to see the door (the only opening to the house,) closed up, and all the seams in the shutter and facings, carefully chinked up with cotton and tar—if I remember right, Mr.

G. gave the following explanation.—For two or three years, on first housing his potatoes, he was careful to have the door kept open until they had gone through a sweat—yet found that he often lost a third by dry rot. At length he was told that the air ought to be carefully kept out until the sweat was over. The truth of this was strongly confirmed to his mind, by the recollection that in using his potatoes he found that the farther they lay from the door the sounder they had kept. He added that he had preserved two crops on the new plan, with entire success—and that after the sweating stage was past, the door was often left open all day, in cold weather, without any sensible injury to the potatoes.

Would it not confer a public benefit, for you to learn if this plan continues successful, and give your readers the information? W.

"THE FULL-BRED BERKSHIRES."

[Some of the agricultural papers have for months back been full of communications and essays on improved breeds of live-stock, and especially of Berkshire hogs; which articles are, in fact, designed as advertisements, and are the most "taking" [in] kinds of advertisements (next to editorial puffs) of the sale stock of the several writers. The agricultural public, as usual, would have continued to be gulled by these writers, and taken all that each of them said for unquestionable truth, put forth purely and solely to benefit the public, but for the over-greediness of these gentlemen, who, not content each to publish that he has stock equal to the best in the world for sale, have each claimed (directly or by inference) that he alone has the real "Simon Pures," and that all others are no better than bastards, if not absolute counterfeits. We have been much amused with the progress of the controversy, which has waxed so warm as to threaten the occurrence of what may be called a war of the humbugs. At the distance we are from the contest and the actors, we cannot pretend to pronounce who are *not* deserving such reproach as is cast by the following, and by some other pieces which we have previously copied. But in some other cases, the right to the character of *humbugger* is as manifest in the communications themselves, as if the writer's name and signature had been "Grant Thorburn." The following seems to be a sensible piece, and its censures to be fairly and properly bestowed. But whether, after all, it is not one of the same numerous batch of advertisements and puffs disguised as communications and essays on breeding, is more than we can decide.

It is scarcely necessary for us to add, as explanation, that we are far from being hostile, or careless in regard to the improvement of our live-stock—and that we have a high opinion of the

value of the Berkshire breed of hogs. But that we hold agricultural cheats and humbuggers, pretending to be agricultural improvers and benefactors, in most especial contempt.—ED. F. R.]

From the Cultivator.

Messrs. Gaylord and Tucker—I have looked on with much amusement, at the quackery attempted to be practised on the public, relative to Berkshire swine; and have been not a little surprised at the assumed dictation of individuals, whose knowledge of this breed, its changes and varieties, has been limited to a few important animals and their descendants; and who have undertaken to determine, from the color of some half dozen hogs brought to this country by Mr. Hawes, how many white hairs constitute a full blood, and how many black feet betray a grade; to say nothing of the twist in the tail, and the bunch of hairs at its end. Now really, gentlemen, you must not wonder that there are scoffers at "book farming," and those among us who set lightly by the scribbling of self love; and while there are many who highly appreciate the much that is useful and instructive in your columns, we must beg leave to laugh at the ridiculous, as its best cure.

It is truly astonishing, that any one should display such woful ignorance as to the real origin and history of the hogs which now fill his sty, as is exhibited by an Albany breeder, in a late number of the Cultivator. He calls them "the full-bred Berkshires." Let us examine this matter a little, and see what are the characteristics of the Berkshires, as given by English writers. Loudon, Cully, "The Complete Grazier," Parkinson, and Low, all agree, with some little differences of expression, in assigning to the original Berkshires, a tawny or reddish brown color, with dark spots. To this, I would add my own testimony, having formerly been myself a resident in the county of Berkshire. The pure-bred native hog at that time was spotted, black and white, in nearly equal proportions, with a greater or less intermixture of reddish hairs, giving a ferruginous hue to the whole coat. They were a long, large, heavy hog; rather flat in the side, always full, and meaty in the ham; somewhat slope rumped, a little heavy in the bone, something straight in the face, but with a tolerable fulness in the jole, and a drooping ear; their hair was inclined to coarseness, and often curly. On the farm where I lived, they were seldom put up to fatten till three years old; and when fit to kill, would average from twenty-five to thirty-five score. We used them for bacon, considering they made better hams and flitches, than any other breed. These were the hogs universally found in Berkshire, in my day. Mr. Astley of Oidatonehall, has, I believe, the merit of having improved this breed as above described, by a judicious introduction of the eastern blood; and the hog thus formed, has been crossed upon almost every race in England, in all cases with the most advantageous results. It is a cross of this improved Berkshire with the Chinese, which we have in this country, under the name of full-bred Berkshires. As to color, had that come under the consideration of the breeder, he might have varied it from pure white to jet black, by making use of the white or black Chinese, with strict reference

to such a result. I shall not pretend to decide which color has claims to superiority, although the black China is considered the most hardy and prolific, while the white is perhaps the better formed. Whether these differences are sensible in their crosses on the Berkshire, I am not prepared to decide. Again—there is of course, great variety of size, and some of form, according to the number and character of the crosses taken from the various races. Many of the smaller Berkshires, so desirable as porkers, are without doubt descended from a cross of the Axfords, in which there is a dash of the Barbadoes blood, strongly tending to confirm the reddish tinge of the old breed. But, without entering farther into detail, I think I have said enough to expose the utter absurdity of these critical distinctions of color, even to the "emblems" of three white toes, &c., which have been held up to just ridicule in some of our late agricultural papers. And who shall say now that he alone has *The improved Berkshires*? What is to become of the "*Rudgwick*" cross, the "*Hampshire*" of the present day, in which the Berkshire blood strongly predominates; the fine boned and delicate "*Dishley*," said to lay on a larger quantity of meat in proportion to bone and offal, than any other kind; Lord Western's celebrated breed of "*the Essex half blacks*," considered by many to be the finest in England? What is to become of these and many others, all of them crosses of the Berkshire family? I would ask, then, on what grounds the Albany importation claim to be the standard of "*The improved Berkshires*?"

In the extra accompanying the May number of the "*Cultivator*," I saw an advertisement of "Pure Berkshires, without any alloy of black Siamese or common white hogs." I should really be glad to see one of the animals, for an improved Berkshire, without any of the eastern blood in him, cannot probably be found in England.

I was much gratified to see in the last "*Cultivator*," an article relative to "true size." The writer indeed lays down the golden rule on that subject. "The greatest weight in the smallest relative compass; *weight for inches, not for surface*." Now, this is just as true with regard to swine, as to cattle. What is it that our breeders are doing, urged by the mania for size, but breeding back again as fast as possible to the old *unimproved* Berkshire, thus undoing in their wisdom all that the science of England has accomplished in so many years? But, say our western friends, we must have size, to fill the pork barrel. Fill it with what? Heads and shanks? They will indeed fill the barrel, but not the consumer, which is a far more important consideration. If the Berkshires can be forced to an increased size, and still retain their light offal, well and good—provided they do not degenerate into the coarse animal, of which there may be no little danger. But I would not be understood as advocating the paltry, short-sighted policy of those from whom we expected better things; who have sent away such "*riff-raff*," to meet the pressing demand for Berkshires, as would induce one to suppose the very scourings of a city suburb had been collected for the purpose. How much more conducive to their own true interests, has been the course pursued by that shrewd, far-seeing people, the Shakers of Watervliet, in carefully preserving the size of their animals, to which I presume they are main-

ly indebted for the late sale of their whole stock to Mr. A. B. Allen, of Buffalo, under whose judicious and careful management, their excellence will undoubtedly be preserved, and the public expectation with regard to them, fully met. They will neither be stuffed to plethory, nor starved to pigmies; and considering Mr. Allen to possess the pride and feelings of a breeder, we may hope to escape the "culls and runts" of his litters, although we may not always be able to command his best; for it is not to be supposed that any "established breeder of reputation," would sell the refuse of his stock at any price, which would be the infraction of a rule well known to the true breeder—although it has not been picked up with other matters of the craft by the dealers in Berkshire pigs, who it seems sell all they can raise, at one price or another—if not \$20, why then 20s.

As the intent of your paper is to elicit truth, and serve the farmer, I presume you will not object to giving the above an insertion. I am not now a breeder of the Berkshire, having given my attention to other departments, but I would lend my feeble aid to the maintenance of science, against quackery in every shape. D.

Cambridge, Mass. August 31, 1840.

SHEEP BREEDING.

From the Eng. Farmer's Magazine.

"When a race of animals have possessed in a great degree, through several generations, the properties which it is our object to obtain, their progeny are said to be well bred, and their stock may be relied on; and it cannot be doubted that any breed may be improved in the same manner."—Sir John Sinclair.

When I consider that there are continually grazing on our fertile pastures thirty-two millions of sheep, which, exclusive of the carcase, produce a yearly clip of wool of the value of seven millions of pounds sterling, employing 350,000 individuals, and ultimately yielding manufactures to the amount of, at least, twenty-one millions of sovereigns annually, my heart expands with English pride, and I am happy my lot was cast in such a country. But then comes the curdling inquiry of how is it that the good common sense of the British farmer, with appliances enjoyed by no other agriculturist in the world, still suffers his green hills to be disfigured with such an inappropriate illegitimate race of sheep? Unwilling as I am to cause pain to any one, or to assume superiority over brother husbandmen, yet imperative truth forces me to regret that even in the middle of the 19th century the following inconsiderate practice prevails:—A farmer rides a day's journey to a sheep letting, where he sees a number of animals of various pretensions, fetching, according to worth or fancy, from fifty shillings to nearly as many pounds. Now this motley batch of varying priced rams have all been bred in the same bungling way from the same flock, and by the same males. And the sheep that is now making twenty pounds is by the same sire as he that but climbs to fifty shillings; the higher priced one being but a chance hit of comeliness, without system in his production, or certainty of what will be his progeny. It could not have happened otherwise, for had those individual sheep been bred with any science or method at all, there could not have been

that degrading disparity in the produce of the same flock. But such a ram breeder has no help in him, for he also yearly goes as far off for his males (there's a charm in great distances,) where he has picked out one, but also without character or pedigree, with nothing but present external appearances and smell of oil cake to recommend him; no one being able to predict whether his offspring will be ringstreaked, speckled, and spotted—whether their faces will be black, gray, or white. At such a market the obtaining a showy sheep is all that can be expected or guaranteed—all the rest is clouds, darkness, or uncertainty, and probably the next crop of lambs may show patches of as many breeds, and as many contradictory defects as there are counties in England. Therefore it cannot be too urgently pressed on the attention of sheep breeders that in hiring rams, a first consideration should be to select from such tup-masters only as have pedigree, uniformity, and character, superadded to a goodly appearance in their general flock.

To those farmers who are undecided from whence to have their next male sheep, I respectfully submit, do not be satisfied with merely seeing a score or two of the firstlings of a flock penned up for display. Quietly go over the whole farm, and alter allowance for variety of pasturage and shelter, see whether there is a uniformity in the flock; whether any promiscuous two or three score of them present such an identity as to render it difficult for individuals to be distinguished from each other. See that the males are masculine, and the females feminine, with an harmonious family likeness running through the whole. Then ask the proprietor how he procured even a flock—whether he changes it by introducing new and unknown males with every returning season? He will answer in the negative, and say he has for a quarter or half a century carefully bred only from such as he well knew, whose uninterrupted pedigree he can produce, and during that time his mutton had not deteriorated, nor his wool lost weight nor quality—that he indulges in no auxiliaries, as cake, corn, or seed, for food, or sheds for shelter, but that they eat nothing but what is grown on the farm—that they are thereby fortified against debasing influences of every kind, and truly a desirable flock to breed from. My sheep being far short of perfection, though perhaps a stage or two in advance of some of my brother breeders, I beg to describe them. Abiding ever by what I have already said about the head—the head is short, round, and without angle or hollow, a tape passed from the throat round behind the ears shall about equal alike the girth from the throat over the eyes and forehead—a quiet but confident aquiline visage (no pig-faced lady for me)—ears woolly, short, well back and down bent, not rabbit fashioned—the neck not straight lined from the rump, but set on at the shoulders at about a 45 upward angle, nor tapering over delicately towards the head, but thick, full, and fleshy along its whole length—blade-bones well-spread far back, and showing the chine above their upper working which will produce a large, open, and heavy breast, not pitched downwards as in the greyhound, but rounded up to a frontage like the forekeel of a ship. This enables the sheep to look well in the face, and gives it a presence as if standing up hill from whatever aspect it may be

viewed, that is gradually rising from the loin to the setting of the neck, which again springs upwards thick, full, and muscular—nor do I object to a slight hollow about the middle of the back, capacious loin, spread out hips, and well connected rumps—wide and fleshy in the twist, legs short, light boned, and under the sheep, not stuck out like four props to a hay stack. I covet not a thick tallow tail, but must have a well woolled belly. Other breeders possibly have better sheep; I know what mine cost, and what they pay, and in this respect am a contented man. I had more to say, but fear I am trespassing. **PRACTICAL.**

P. S. Of course I have been speaking of the muscular frame, not of the fatty obliteration of all form, in my flock of sheep.

HENERY—NOT HENRY.

From the Maine Cultivator.

Henery, says our neighbor Adams of the Temperance Gazette, is to *hens*, what piggery is to pigs or rookery is to rooks,—he might have added, or hoggerly to hogs, and cowery to cows. We are glad to find him so learned in these matters, and especially to see him willing to turn his knowledge to a *practical account*.

During a late visit in Winthrop, he noticed the henery establishment of Rev. D. Thurston, which as he thinks it an improvement on the common method of keeping hens, he thus describes in the last Gazette:

"*Improved Henery*.—We are not sure that *Henery* is a dictionary word, but we suppose that our readers will understand it. If not, we would say that henery is to hens, what piggery is to pigs or rookery to rooks: a place where these useful feathered bipeds congregate and perform the appropriate duties of their station. We lately met with one of these establishments, which seemed to us so excellently adapted to its purpose, that we have thought it worth a brief description.

First, then, in the upper part of the barn is an apartment 12 feet square, boarded so as to prevent the escape of what is put within it. Here the fowls are to roost, lay their eggs, and perform all their in-door work. At the distance of a rod and a half from the barn, on the borders of the garden, is another apartment of about the same dimensions as the first, surrounded by a high fence, made of lath stuff, sawed two inches wide, and nine feet long, and put on close enough to prevent the hens from getting out. These two apartments are connected by a covered way, which passes from the scaffold of the barn, in what some would call a *slantindicular* direction, to the fence, about three feet from the top, and is continued down to the ground in the inside of the yard. This is made tight top and bottom, and on one side, but with open work on the other side. Through this covered way, the inmates of the establishment pass when they choose, taking the air and enjoying the prospect, and when they come into the out door apartment, they indulge, *ad libitum*, in their favorite amusement of scratching dirt and devouring gravel.

The result of the whole is, they are kept under perfect control, and yet enjoy all that liberty which is essential to their health and comfort, and when you want a fresh egg, you have only to lift a lid

over a row of little apartments, in which their nests are made, and you will find at almost any time of the day, a plentiful supply. The little chickens too, as soon as they are large enough to make excursions abroad, will be ready to perform an excellent service in the garden, by devouring the grubs and insects. Thus the inhabitants of our villages and of our cities even, who have "scope and verge enough" to possess a barn and a garden, can keep as much poultry as they choose, without infringing in the least upon the laws of good neighborhood. Those who may wish to inspect the establishment we have described, may be gratified by calling on the Rev. D. Thurston, of Winthrop."

The plan, doubtless, is a good one. By such an enclosure, the fowls are kept from doing damage in cultivated grounds, are prevented from roving to their own hazard and injury, and will, if properly fed, lay their eggs and rear their young better, than if they enjoyed a more enlarged liberty. Care should be taken, however, when they are confined to supply them liberally with water, gravel, lime and animal food—such as fresh meat, worms, &c. In this way, people in large villages and cities can keep hens as well as if they lived on farms in the country. Indeed, it would be better for farmers if they would, at certain seasons of the year, keep their poultry in such an establishment.

We do not know as we understand the necessity or the benefits of *separating* the yard from the barn, by the distance of a rod and a half of unoccupied ground, connected by the "covered way," or tube leading from the barn to the yard. Our establishment differs from the foregoing chiefly in this particular. The yard is directly attached to the back side of the barn, from the wall of which a roof projects, under which are poles for roosts. This is a shelter from the rains and winds. On a level with the floor of the barn, two holes are cut, several feet distant from each other, sufficiently large to enable a hen to enter one and skulk out of the other into the yard again if she wishes. The hens like secrecy in these important matters. Within the barn is a long chest, covered by a lid, having a communication with the yard by the holes aforesaid. The chest is partitioned off into nests, where each hen is allowed to lay her eggs "alone in her glory," little suspecting, perhaps, that the top of her excellent place of concealment is liable to be opened, and her eggs taken away by human stratagem.

OF THE WASTE LANDS OF FRANCE.

From Arthur Young's Agricultural Survey of France.

SOLONGE.—There is, in this province, such a large mixture of waste, even in the most cultivated parts, and cultivation itself is carried on upon such barbarous principles, that there will not be much impropriety in considering the whole as waste; to every spot of culture called a farm, a much greater proportion of rough sheep-walk and wood (eaten down and destroyed) is annexed; so that any good farmer, who got possession of 1000 or 1500 acres, would conclude the whole as waste and treat it accordingly: by much the most unproductive and poorest part of such a tract would, in every case, be the lands at present under the

plough. I may, in confirmation of this general idea, add, that there are many absolute wastes in France, that yield as good and even a better produce than all Sologne, acre for acre. I know no region better adapted for a man's making a fortune by agriculture, than this; nothing is wanted but capital, for most of the province is already inclosed.

BERRY.—*Chateauroux.*—Leaving this place for the south, enter vast heaths of ling and furze, but much mixed with trefails and grasses. Some small parts of these heaths are broken up, and so ill ploughed, that the broom and furze are in full growth. After this another heath, of several miles' extent, where the landlords will not give leave either to build or break up, reserving the whole for sheep, and yet not stocked; for the people assert, that they could keep twice the number, if they had them.

LIMOUSIN.—*To Limoges.*—The mountainous heaths and uncultivated lands are commons, and therefore every metayer sends his sheep in the common flock of the village.

BIGORRE.—*Bagnères de Luchon.*—The waste tracts of the Pyrennees, by which are to be understood, lands subject to common pasturage, are so much subject to the will of the communities, that these sell them at pleasure. Formerly the inhabitants appropriated to their own use, by inclosure and cultivation, what portions they pleased; but this obtains no longer; at present the communities sell these wastes, and fixing a price on them, nearly to their value, new improvements are not so common as heretofore.

LANGUEDOC.—*Narbonne to Nismes.*—This vale, which is by far the richest of Languedoc, in productions, is of no considerable breadth, yet the quantity of waste neglected land in it is very great.

Monrejeau to Lann-Maison.—Vast wastes, covered with fern; the soil good; and land projecting into it cultivated to advantage.

Bagnères de Bigorre.—These immense fern-wastes continue for many miles, with many new improvements in them. They belong to the communities of the villages, which sell portions of them to any persons willing to buy. The price most common has been 20 liv. the journal, of 128 cannes square, the canne 8 paces; the pan 8 inches and 4 lines, 4 journals, making an arpent. The method of improving has been, first to burn all the fern and rubbish, then to mattock it and sow rye, which is pretty good; then oats for six, seven, or eight years, according to circumstances; after that they summer-fallow and take wheat. Some they leave to grass and weeds, after those eight crops of oats; a detail of the husbandry of barbarians! They have all a right of commonage on the wastes, as long as these continue uninclosed; consequently can keep cattle, and especially sheep, to any amount in summer; yet, in their inclosed improvements, they give not a thought to raise winter food! Such stupidity is detestable. The parish of Cavare has 104,000 arpents of these wastes, without one metayer; all are peasant proprietors, who buy morsels as it suits them. The improvements are exempted from tithes for ten years; but not at all from the King's taxes, which is shameful.

BEARN.—*Pau to Moneins.*—Vast wastes of rich soil, covered with an immense product of fern, to the amount of five or six wagon loads an acre.

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St. Palais to Aspean.—Vast wastes; belonging to the communities of the parishes, that sell them to whoever will buy: a common price 120 liv. per arpent; but after they are brought into culture, they sell for at least 300 liv. The advantages of this system, which extends through the whole region of the Pyrennees, is prodigious: it excludes the rights of commonage, because all is inclosed as fast as bought; and enables every industrious man that saves a little money, to become a land proprietor, which is the greatest encouragement to an active industry the world can produce; it has, however, one evil, that of too great a population.

Bayonne to St. Vincents.—In this line I came first to the *landes* of Bourdeaux, because they extend from the gates of Bayonne to those of Bourdeaux, and of which I had read so much, that I was curious to view and examine them; they are said to contain 1,100,000 arpents*. They are covered with pines, cork trees (only half the value of pines), broom, whins, ling, and furze; the soil sand, but the growth of trees shows a moist bottom. There is a good deal of cultivation mixed with the waste this first stage. There is much land also under water, a sort of sandy fen. Pass a great space, without trees, covered with dwarf furze, ling, and fern. Others before Dax; one of them of five or six miles long, by two or three broad: much rough grass and ling on it: but none of these tracts appear half stocked.

Dax to Tartas.—This district is a deep white sand, the whole of which has evidently been *lande*, but part of it inclosed and improved; much is, however, yet rough.—Singular scene of a blowing sand, white as snow, yet oaks growing in it two feet diameter; but a broken ground discovers a bed of white adhesive earth, like marl, which explains the wonder.

Learn at Tartas, that these immense wastes, the *landes*, without pines or wood, are to be purchased, at all times, very cheap indeed, of the king, the great lords, and of the communities of many parishes, even so low as 3 liv. per arpent, with an exemption from tithes, and from taxes for twenty years. But every one here reckons them so bad, that all the money spent would be sure to be lost; yet it is admitted that there is a bed of marl or clay under all the country. This opinion is chiefly founded on the attempts of Mons. Rollier, of Bourdeaux, having made a trial of cultivating them, and succeeded very ill. I guessed how such improvements had been attempted, and told my informants what I supposed had been done; and my guess proved exactly right: corn—corn—corn—corn; and then the land pronounced good for nothing. It does not signify telling such people, that the great objects in all improvements of wastes, are cattle, and sheep, and grass, after which corn will be sure. Nothing of this kind is comprehended from one end of France to the other.

As I shall here take my leave of these *landes*, I may observe, that, so far as they are covered with pines, they are not to be esteemed wastes; but on the contrary, occupied with a very profitable culture, that does not yield less than from 15s. to 25s. an acre annual revenue. Of the very exten-

* De la Necessité d'occuper tous les gros Ouvriers, p. 8.

sive tracts not so employed, and which are to be purchased at so cheap a rate, they are among the most improveable districts in the kingdom, and might be made, at a very small expense, capable of supporting immense flocks of sheep.

Cavignac to Pierre Brune.—Many sandy wastes, with white marl under the whole.

To Chersac.—Great wastes, of many miles extent, covered with fern, ling, and shrubby oak; all greatly improveable.

To Montlieu.—Ditto. Many of these wastes belonged to the Prince of Soubise, who would not sell, but only let them; the consequence has been, that no improvements have been wrought.

La Graule.—The wastes in this country are sold at 10 liv. the journal, and less; some better at 20 liv. The journal here is to the English acre as ten to thirty-eight; it consists of 10 carreaux, each 18 feet square.

NORMANDIE.—Valogne to Cherbourg.—Mons. Doumerc, of Paris, having bought of Monsieur, the king's brother, 3000 arpents, part of 14,000 sold at the same time, being parcel of an ancient, but much neglected, forest, has made an improvement here, which, so far, deserves attention, as it shows the principles on which French improvers proceed. He has brought into culture 700 verges, which form his present farm, around a house for himself, and another for his bailiff, all built, as well as many other edifices, in much too expensive a manner; for these erections alone cost 2500 louis d'or. Such unnecessary expenditure in building is generally sure to cripple the progress in much more necessary matters. The first business in the improvement, was to grub up the wood; then to pare and burn; and manure with lime, burnt with the furze, fern, and heath of the land; the stone was brought from Valogne: as soon as it was cleared, it was fallowed the first year for wheat. Such infatuation is hardly credible! A man is commencing his operations in the midst of 3000 acres of rough ground, and an immense pasturage for cattle and sheep, begins with wheat; the same follies prevail every where: we have seen just the same course pursued in England, and prescribed by writers. Such people think cattle and sheep of no importance at the beginning of these improvements. This wheat, limed at the rate, per arpent, of 7 or 8 tonneaux, of 25 boisseau, each 18 pots of 2 pints: 4 boisseau of seed sown, and the crop 40 boisseau. After this wheat sown 5 boisseau of oats, the crop 40. Then barley, seed 4 boisseau, produce 20 to 25 boisseau. With this barley clover sown; mown the first year twice, and pastured the second; being then ploughed for wheat, which is inferior to the original crops; then oats and fallow again. From all these crops it is sufficiently evident, that French farmers esteem corn, and not cattle, the proper support of a new improvement. The soil which has been thus reclaimed, is on a stone quarry in general; a friable sandy loam, covered with a strong spontaneous growth (where not forest) of furze, fern, and in some places, heath; mixed with much grass, and even clover and *millefolium*; which, if properly stocked by cattle, well fed in winter, would be of no considerable value in its present rough state.

Though the methods pursued have not been calculated on the best principles, yet there is certainly a considerable degree of merit in the under-

taking. Last year's crop of wheat produced 40,000 gerbs; and this year (1787) there is one piece of oats, of 80 verges, which gives 12,000 gerbs, at 15 boisseau per hundred; each boisseau 40 lb. and the price at present 45s. The present stock 207 wethers, 10 horses, 21 working oxen, 10 cows, 1 bull, 6 young cattle, are certainly fine, for a spot where, ten years ago, Mons. Baillio, the bailiff, who has executed the whole, and who seems to be a truly excellent man, was in a hovel, with no other stock than a dog. The whole improved, would now let at 15 liv. per verge, 2½ to the arpent.

BRETAGNE.—Combours to Hédé.—Pass an immense waste for a league, but to the left a dead level, boundless as the sea; high lands at one part, seemingly 8 or 10 leagues off. Every part which the road passes, has been under the plough, for the ridges are as distinct as if made but last year; and many ruined banks of hedges cross it in various ways. The spontaneous growth, furze, ling, and fern; the soil good, and equal to valuable crops, in a proper management. The king has part, Mons. de Chateaubriant part, and other seigneurs also; but every body I talked with says it is good for nothing. Would to heaven I had 1000 acres of it at Bradfield! I would soon put that assertion to the test.

Rennes.—The waste lands, which, in almost every part of the province, extend for many leagues, are almost every where to be bought, in any quantity, of the seigneurs, at 10s. the journal, which is to the English acre as 47 to 38, with a small quit-rent per annum.

St. Brieux.—Inquiring here into the period of the cultivation which I every where remarked on the *landes* of Bretagne, I was told, that it was no ancient culture, but common for peasants, who took them of the seigneurs, to pare and burn, with the *ecoubu*, exhaust, and then leave them to nature: and this for forty, fifty and sixty years back. Rented for ever, at 20s. to 30s. the journal.

St. Nazaire to Savanah.—Immense bog marked on all the maps of Bretagne, and filling the space of many leagues, covered with vast growth of bog myrtle and coarse grasses, three or four feet high; what a field for improvement, in a climate that gives such a spontaneous growth!

To Nantes.—In the *landes*, which, strange to say, extend to within three miles of Nantes, there was an improvement attempted some years ago: four good houses of stone and slate are built, and a few acres run to wretched grass, which have been tilled, but all savage, and become almost as rough as the rest: a few of the banks have been planted. This may be the improvement I heard of afterwards at Nantes, made by some Englishmen, at the expense of a gentleman, and all the parties ruined. I inquired how the improvement had been effected: wheat, rye, oats!!! Thus it is for ever: the same methods, the same failures, the same folly, the same madness. When will men be wise enough to know, that good grass must be had, if corn is the object?

Nantes.—I have now travelled round the vast province of Bretagne, and may observe, that so large a proportion of it is waste, as to be difficult to calculate: I have passed tracts of land, of three, four, five, and even eight miles in extent, without any cultivation, and I have heard of much more

considerable, even to fourteen leagues in length. I have marked one district in the map which contains some hundred thousand acres. Three-fourths of the province are either waste, or so rough as to be nearly the same thing. This is the more surprising, as here are some of the first markets in France; that is to say, some of the most considerable commercial towns; and every where the vicinity of the sea. These enormous wastes, which are said to exceed two millions of arpents*, are found, as I have remarked, in my notes on the great road, within four miles of such a city as Nantes: vast districts are to be had on leases, or rather property for ever, on the payment of very flight fines. The soil is generally very improveable; I mean, convertible to cultivation, at a very small expense, and with great facility; contrary to the assertion of every body in the province, who have been so used to see it desolate, that they cannot readily believe it capable of a better husbandry than being burnt, exhausted, and left to nature. The means of improving these wastes are absolutely unknown in France, and not much better understood in England. The profit of the undertaking, however, when properly pursued, upon the never-failing principle of grass—sheep—cattle—corn; instead of the common blunder, which puts the cart before the horse (if I may use a vulgar proverb), will be found great and rapid.

ANJOU.—*Turbilly*.—In the Journal part of this work, I have explained the motives which carried me out of my road, to view the wastes of this vicinity, and particularly the improvements of the late Marquis of Turbilly, described at large in his *Memoire sur les Defrichemens*, which has been so often cited in almost every language.

The immense heaths, or *landes*, are in general a sandy or gravelly loam; some on a gravel, others on a clayey, and others on a marly bottom; and others, again, on imperfect quarry ones: the spontaneous growth would predominately be every where forest, particularly of oak, if it were inclosed, and preserved from depredation. At present, it is wood browsed and ruined, fern, furze, broom, ling, &c. &c. In the desert state in which the whole country is left at present, the value is nothing else but what it yields to a few cattle and sheep; not the hundredth part of what might be kept, if any well regulated provision were made for their winter support. I passed ten miles over these heaths; they were, in some directions, boundless to the view; and my guide assured me, I might continue travelling upon them for many days. When at Tours, I was told of their extending much in that direction also. The climate is good. There are streams that pass through these wastes, which might be employed in irrigation, but no use whatever made of them; there are marl and clay under them, for manure; and there is every where to be found plenty of pasturage, for the immediate summer food of large flocks.—in a word, there are all the materials for making a considerable fortune—except skill and knowledge.

Such was the country in which the late Marquis of Turbilly sat down, at an early period of life, determining to improve his estate of 3000 arpents in these deserts; with all the necessary activity of disposition; every energy of mind; and that ani-

mated love of laudable attempts, to give life and efficacy to the undertaking. Some meadows and plantations, which he made, succeeded well, and remain; but, of all his improvements of the heaths, to the inconsiderable amount of about 100 arpents, hardly any other traces are now to be seen, except from the more miserable and worn-out appearance of the land; which, after cropping, was of course left in a much worse condition than if it had never been touched. The fences are quite destroyed; and the whole as much *lande* as before improvement. This flowed from the unfortunate error, so common, indeed so universal, among the improvers of waste lands; and unexceptionably so in France—that of improving, merely for the purpose of getting corn. Pyron, the laborer who worked in all the Marquis' improvements, informed me, that he pared and burnt, which is the common practice of all the country, and then took three crops of corn in succession; that the first was very good, the second not good, and the third good for nothing, that is, not above three times the seed: from that moment there was an end of improvement; it only crawled, during many years, to the amount of 100 acres; whereas, if he had begun on right principles, he would, in all probability, have improved the 3000; and, others copying his modes, the whole country might, by this time, have been under cultivation. It was reckoned a vast effort in him to fold 250 sheep; and this was the best engine he had in his hands; but giving the fold for corn, it was lost as soon as exerted. Instead of 250 sheep, the Marquis should have had 500 the first year, 1000 the second, 1500 the third, and 2000 the fourth; and all his paring, burning, manuring, folding, exerted to raise turnips (not their contemptible *raves*) to winter-feed them; with so much burning, folding, and eating off the turnips, the land would have been prepared for grass; and when once you have good grass, good corn is at your command. Thus corn was the last idea that should have entered his head: instead of which, like other French improvers, he rushed upon it at once—and from that instant all was ruined.

The particular advantages of the spot are considerable, if ever an improver should arise, with knowledge enough to pursue the methods that are adapted to the soils and situation. The hills of all the country are so gentle, that they are to be tilled with great ease; offering the advantage of perennial streams, that run at present to waste in the vales. There are rich veins of white marl, with an under-stratum, in many places, of clay. There is a hill of shell sand, for improving the stiffer soils and moory bottoms. There is limestone at the distance of half a league, and plenty of peat to burn it. The Marquis of Galway's father spread some of the shell sand on a small poor field, and had an immediate luxuriance of crop in consequence. The present curé of the parish has tried the marl, with equal success. But both these manures, and indeed any other, would be absolutely lost, if a succession of corn crops were immediately to follow. It is this valuable under-stratum of clay and marl which gives such a growth to wood. In passing from La Fleche to Turbilly, I was amazed, in some spots, at the contrast between the apparent poverty of the surface soil, and the oaks scattered about it; they, are in general, eaten up by cattle, yet

*De la Necessité d'occuper tous les gros Ouvriers, par Mons. Boncerf. 1789. p. 8.

the bark is clean and bright, and this year's shoots four and even five feet long. A common mode, and indeed the only one, of attempting improvements here, is to permit the peasants to pare and burn pieces of the heath; to take five crops in succession, but to leave the straw of the last; to fence the piece around; and to sow whatever seeds of wood the landlord provides, usually oak, for a copse, which, in this villanous way, succeeds well; but as such copses are fenced with a ditch and bank only, and never any hedge planted, they are presently open and eaten.

MAINE.—*Guesselard.*—The *landes* of Anjou extend over a great part of Maine also. Here they told me, that the extent in that neighborhood is hardly less than sixty leagues in circumference, with no great interruption of cultivation. The account they give of the soil is, that it is absolutely good for nothing but to produce wood, which it will do very well. The seigneurs sell it out for ever, in any quantity, at the rent of half a bushel of oats an arpent (the bushel 30 lbs. of wheat), and some at 10s. to 20s. the peasants pare and burn, and get a very fine crop of rye; then another poor crop of rye; and after that a miserable one of oats; reckoning, in common, that a burning will give just three crops; after which the land is strictly good for nothing, but is left to nature to recover itself. The price of paring and burning 30 liv. per arpent. I can hardly record these instances of barbarism with tolerable patience—without dealing execrations, not against a poor unenlightened peasantry, but against a government possessing, in demesne, immense tracts of these lands, without ever ordering any experiments to be made and published, of the best methods of improving them. But had it come into any such projects, and had those experiments had French conductors, they would have been merely with a view of getting corn! corn! corn!

To Le Mans.—Much of these wastes here resemble the sands of Sologne; upon a dead level, and water standing in many places; yet the soil a sand; and, in spots, even a running one: it arises from the same circumstance which makes them productive of oak timber, wherever preserved, viz. the bottom of clay and marl.

BOURBONNOIS.—*Moulins.*—Three fourths of the whole province waste, or heath, or broom or wood.

St. Pourcain.—As I quitted the Bourbonnois in this vicinity, entering Auvergne, it will not be improper to remark, that the whole province, as well as that of Nevers, ought, respecting all the purposes of improvement, to be deemed waste. The culture that is carried on, without any exception, on the arable lands, is only fallowing for rye; and, after two or three rounds, the land is so exhausted by this blessed system, that it is left to weeds: broom is the prevalent spontaneous growth in such a case; and if the broom be left for a number of years, it becomes a forest. This rye-culture produces the landlord, for his half (as all is in the hands of metayers), about 2s. 6d. or 3s. an acre through the whole farm, by corn, cattle, &c.; and at such rates a vast proportion of the province is chiefly to be bought. Considering that the lands are all inclosed; that wood enough is every where found; that the country is furnished with a sufficient quantity of buildings; that the roads are excellent; that it enjoys a navigation to the

capital; that markets are good, and prices high; that there is marl or clay under the sands and sandy gravels; that the climate is one of the finest in Europe; and the country highly pleasant and beautiful; when all these circumstances are well weighed, it will be admitted that no part of France is so eligible to establish a great and profitable improvement; but, as I must again repeat it, the whole province appears waste to the eyes of an English farmer.

AUVERGNE.—*Brioude.*—The mountains in this neighborhood too much cultivated; the earth is, by such means, washed away by storms, and torrents drive away every thing.

VIVARAIS.—*Pradelles.*—Pare and burn old turf in these mountains. Great tracts burnt, exhausted, and left to nature to recruit.

To Thuytz.—Cultivation is carried on in these mountains to an incredible height; and is all by hand. In some cases, earth is carried, by hand, in baskets, to form the terraced beds, that yield a difficult and scanty crop, that is brought away on the back. Nothing could possibly support such exertions, but the whole being small properties; every peasant cultivates his own land.

PROVENCE.—*Tour d'Aigues.*—The mountains here are all calcareous, yet they are, from a vicious culture and management, destroyed and abandoned, and yield subsistence to a few miserable goats and sheep only; such mountains in the Vivarais, the President remarks, are covered with superb chestnuts, that yield a good revenue—this country would do equally well for them, as appears from the very fine ones found in the park of Tour d'Aigues. The cutting of every bush for burning the earth is the cause; this species of culture loosens the surface, and renders it a prey to torrents; so that all is washed into the rivers, and becomes the destruction of the plains. The Durance, in its whole course, of near 200 miles, has destroyed, on an average, to the breadth of half a league.

General Observations.

In the preceding notes, mention is often made of great tracts of country, so miserably cultivated that the whole would, by a good English farmer be considered as waste. This is particularly the case in Bretagne, Maine, Anjou, Sologne, Bourbonnois, &c.; and it is this circumstance which reduces the general average product of France to so low a pitch, as appears in the chapter which treats of it, notwithstanding the immense tract of twenty-eight millions of rich land, the products of which are, of course, very high. Here then ought to be the great effort of a new system of government in France. The revolution has cost immense sums; and has occasioned a happy defalcation of the revenue, provided it be replaced wisely and equally, on some object of general consumption, and not on land; but the public burthens of the kingdom are so heavy (proportioned to its consumption and circulation,) that every attention should be exerted to increase and improve the contributing income; and this can in no way, and by no methods, be effected so well and so easily, as by spreading improvements over these immense wastes, which are such a disgrace to the old government. The wastes alone are calculated in these sheets, at 18,000,000 of English acres; if to these we add the tracts, in the above mentioned

provinces, which, though cultivated, are no more productive than wastes, and much of them not of equal profit, we cannot reckon for the whole less than 40,000,000 of acres that are in a waste state: not absolutely unproductive, but which would admit of being rendered four, five, six, and even ten times more so than they are at present. This extent is nearly equal to that of the kingdom of England; whence we may judge of the immense resources to be found in the improvement of the agriculture of France; and the wisdom of the measures of the National Assembly ought to be estimated in proportion to their exertions in this respect, rather than in any other. If they give a ready, immediate, and absolute right of inclosure; an exemption from all taxation whatever, for twenty-one years; and, by a wise system of imposts, the future prospect of not being too much burthened; if such be their encouragements, in addition to the great ones already effected, particularly in the abolition of tithes, they may expect to see, in a few years, great undertakings on these desolate tracts. But the policy of a good government will not, in this point, do the whole; it may encourage buildings, inclosures, manuring, and the investment of large capitals; but if these soils be attempted to be cultivated, as they have hitherto always been in France, failure, bankruptcy, and ruin, will be the consequence; and the lands, after a few years, left in a worse state than they are in at present. The government should therefore, not omit taking the necessary steps, to have instructions well diffused for the cultivation of these immense tracts of country; not in the spirit of the old* system, by printing memoirs, which, if followed, probably would spread more mischief than benefit, but by the exhibition of a farm in each considerable district, under a right management, and in that degree of perfection of culture which is applicable to the practice of all mankind; of the poor farmers as well as of rich ones: every other

species of perfection does well enough for gentlemen to commend, but is not adapted for farmers to imitate. One large farm, taken entirely from waste, in Bretagne, another in Anjou, a third in Sologne, a fourth in Bourbonnois, and a fifth in Guienne, would be sufficient. If these farms were cultivated on right practical principles, on those of utterly disregarding corn till the ample support of sheep and cattle (but particularly the former) in winter, by means of green crops, and in summer by grasses, gave such a command and facility of action that whatever corn was then sown, would, in its produce, be worthy of the soil and climate of France, yielding ten for one on these wastes, instead of five or six for one, the present average of cultivated lands, in that kingdom. If this were done, I say, the profit of such improvement would be equally great and durable; the practice exhibited would take deep root in the respective provinces; and extensive and speedy improvements would be the consequence. By such a policy, the National Assembly would prove themselves genuine patriots; the kingdom would flourish; population, which, at present, is a burthen, would be rendered useful, because happy; and the consumption and circulation of these provinces increasing, would give a spur to those of the whole society; the weight of taxes would lessen, as the basis enlarged that supported it:—in a word, every good effect would flow from such undertakings, if properly executed, that can add to the mass of national prosperity; and consequently the most worthy of the attention of an enlightened legislature*.

Attempts have been made to improve these wastes, but always with ill success; I saw a neglected farm gone back nearly to its pristine state, not far from Nantes; the Marquis of Turbilly's, in Anjou, had no better success; and equal failures attended those that were tried on the heaths of Bourdeaux; and I heard of some others, similar undertakings, in different parts of the kingdom; but, in general, they were all equally unsuccessful; and no wonder, for all were conducted on the same plan, with no other object in view than corn; but this is the least important of the products, as it hath been above observed, that should be found on new improvements. A French writer, who speaks from experience, as well as the Marquis of Turbilly, prescribes this course;—1, dig, at the expense of 20 liv. per arpent, of 46,000 feet, in

* The edict, exempting new improvements from taxation, was in the right spirit. We are informed by Mons. Necker, that from 1766 to 1784, no less than 950,000 arpents were declared *défrichés*. *De l'Administ. des Fin.* 8vo. T. iii. p. 233. There can be no doubt but the greater part of these are long since abandoned again to nature. I never met with a single person in France who had half an idea of improving waste lands; and I may add, that, of all other practices in the agriculture of England, this is the least understood. See my *observations on the present state of the waste lands*. 8vo. In regard to the excellent edict above-mentioned, there occurs a proof of the gross and consummate ignorance which one meets so often in France on all agricultural subjects, In the *Cahier du Tiers Etat de Troyes*, p. 38, they demand the abrogation of this edict, as prejudicial to the nourishment and multiplication of cattle. Even the nobility of *Cambray*, *Cahier*, p. 19, are against cultivating commons. The nobility of *Pont-à-Moussin*, *Cahier*, p. 38, declare, that the encouragement of inclosures and *défrichemens*, is prejudicial to agriculture; shame on their folly! The clergy are wiser; for they demand that the possessors of wastes shall either cultivate them themselves, or let others that are willing, on reasonable terms. *Cahier de Melun and Moret*, p. 22; and that all commons shall be alienable for the prosperity of agriculture. *Bayonne*, Art. 51. And some of the *Tiers Etat* also; all commons to be divided. *Colentin MS.* And new *défrichemens* to be exempted from all taxes for twenty years. *Nîmes*, p. 19. *La Rochelle*, Art. 17, *MS.*

* At present (August 1793) we know what the blood-hound government of France have done for agriculture: completely ruined all that was good in it.

† *Experiences and observations sur les Défrichemens*. Par Mons. le Dosseur. *Lamballe*. 1775. 4to. P. 26, 28, 33. This gentleman tells us, that paring and burning should be practised only on a calcareous soil, for in Bretagne the peasants get up two or three crops of corn by it; and if more, much dung is requisite. But if they can have two crops of corn, cannot they have one crop of turnips? Cannot they have grass, which seems never to be in his contemplation, though almost the only thing that ought to be in view. De Serres knew better; he recommends paring and burning, describes the operation, and answers the objection of those who urged a short continuance of the profit, by showing, that such cases proceed from improper management, and do not occur, if the laws of good tillage be pursued, *au cultiver et au reposer*. Le Théâtre D'Agriculture, par D'Olivier de Serres. 4to 1629. p. 64 to 70.

winter, and summer-fallow, with many ploughings and harrowings, for—2, wheat;—3, oats;—4, fallow;—5, wheat;—6 oats, &c. &c. This gentleman, who tells us he broke up and improved 150 arpents, has not explained how *real* improvement is to be made without sheep or cattle. Where is his winter food in this preposterous course? If these 450 arpents be really improved they have cost him five times more than they are worth; but I suspect they are—improved *à la Turbilly*. It is mere romance to think of improving wastes profitably without a great flock of sheep. The ideas of French improvers seem rooted in a contrary spirit; to the present moment, there is no other plan than the old one of corn. A publication of the year 1791, *Memoire sur l'Utilité du Défrichement des Terres de Castelnaud-Medoc*, speaks of the same methods—*déraciner—laborer—herse—ensemencer—froment—seigle*, p. 5. The same views in every part of the kingdom; but when you inquire for cattle, you have, on some hundreds of acres, seven cows, three mares, four oxen, and no sheep! (p. 4.)

As the subject is one of the most essential in French agriculture, I will very briefly sketch the right principles on which alone waste countries can be improved to profit. The rapid view which is practicable for a traveller to take, will allow no more than an outline; fully to explain the process would demand a distinct treatise.—1. The buildings, upon which so much money is generally so uselessly employed, should, in a private undertaking, be adapted to that sized farm, which lets in the country most advantageously; but, in a public undertaking, they should be adapted to that sized farm which is most favorable to a beneficial cultivation of the soil; in the latter case from 400 to 600 acres. This attention to the scale of the buildings flows from the plan of the improvement, which is that of letting the land in farms, as fast as it is well improved, and brought into the cultivation in which it ought afterwards to remain. But whatever the size of the future farms may be, the strictest attention ought to be had to keeping this part of the expenditure as low as possible; it contributes little to the productiveness of the land, except what arises from convenient offices for cattle and sheep.—2. The next object is to buy a large flock of sheep, to feed on the lands in their waste state, that are to be improved; five hundred would be a proper number to begin with. These sheep should be, as nearly as possible, such as the South Downs of England; of the French breeds, the most profitable, and the best to procure, would be those of Roussillon. It is of more consequence to have a breed not too large, and well clothed with a short firm fleece, than larger or more expensive breeds.—3. The first summer should be entirely employed in paring and burning, and cultivating, at least, 100 acres of turnips and rape, for the winter support of the sheep and plough-oxen. After the turnip season is past, the paring and burning to continue for rye, artificial grasses to be sown with the rye.—4. Begin, as early in the spring as possible, to pare and burn fresh waste, first for a crop of potatoes, on fifteen or twenty acres, and then for 200 acres of turnips. The turnip land of last year to be sown with oats, on three ploughings; and with the oats, over fifty acres, clover-seed to be sown. After the turnip season is past, continue paring and burning for rye,

as before. The laborers employed in the summer on paring and burning, to work in the winter on ditching, for forming inclosures; the banks to be planted with white thorn, and willows for making hurdles.—This is sufficient to state the leading principles of the undertaking. Economy in the execution demands that the laborers employed should have work constantly; in summer paring and burning, and managing the hay and corn harvest; and in winter ditching; quarrying, if there be lime-stone on the premises, for burning lime, for manure; and, if not, digging and filling marl, or chalk, or other manures which may be found under the surface. In like manner the number of masons and carpenters should be so regulated, in proportion to the works, so as to find constant employment through the building season.

The courses of crops will explain the whole business of tillage. On the land pared and burnt, and planted with potatoes in the spring, the following rotation: 1, potatoes;—2, oats;—3, turnips;—4, oats, and grass seeds for laying down.

On the land pared and burnt, and sown with turnips at midsummer:—1, turnips;—2, oats;—3, turnips;—4, oats, or barley, and grass seeds for laying down.

On the land pared and burnt, and sown with rye in autumn:—1, rye;—2, turnips;—3, oats;—4, turnips;—5, oats and grass seeds for laying down.

All the turnips to be fed on the land with sheep, by hurdling, except the small quantity that would be wanted for the plough oxen.

All the grasses to be mown the first year for hay, and then pastured by sheep, for two, three, four, or more years, according to circumstances. When they wear out, or betray indications of a want of renewal, they may be broken up with a certainty of yielding grain in plenty; but no two crops of white corn ever to be sown in succession: by white corn is understood wheat, rye, barley, and oats.

A very easy, and, in some cases, effectual method of improving heaths, is by grubbing up the plants that grow spontaneously, and spreading lime upon the waste without any tillage, sowing grass seeds and covering them by the sheepfold: it is surprising what a change is thus effected at the smallest possible expense; soils, apparently miserable, have been made at once worth the rent of 20s. per acre.

It is not possible to give more than an outline in such a sketch as this; variations, arising from a difference of soil, will occur; which, though not considerable, must be marked with care, or useless expenses will often be incurred. The method just hinted at is particularly applicable upon those wastes, which are, in culture, sterile, from abounding with the vitriolic acid; the case of many in Bretagne; where pudding stone is found in some districts at six to eight inches under the surface: cultivation on such, by the plough, may be so tedious and expensive, that the mere paring and burning, and application of a calcareous manure, lime or marl, with grass seeds, and fold, as above-mentioned, would be much the best improvement, as I have myself experienced, in a country more vitriolic and sterile than any wastes I saw in Bretagne.

The progress of the flock will, by its procreation, show what may be the given progress of such an improvement, providing turnips, in the proportion

of one acre to five sheep, which will allow enough for oxen and other cattle, and supposing the losses upon a flock to be 5 per cent.

If the breed of sheep be good, all the ewes should be saved, for increasing stock, and the wethers should be kept until two years old and past, sold fat from two to three years. On such a plan, a stock increases rapidly, perhaps more so than the capital employed. But the conductor of such an undertaking would of course proportion his flock to his money, so that all the works might be constantly going on, without stop or break; to effect which, would demand no inconsiderable foresight and knowledge of the business.

By the plan of letting the lands, as soon as brought into complete cultivation, the capital employed in the undertaking would be exerted to the utmost force and advantage, in spreading the improvement over the greatest possible breadth of waste. If the lands were all to be kept accumulating into one farm, it would grow too vast to be managed with profit; but, by letting, the principal attention, exertion, and force of capital would be always employed where most wanted and most useful; and it is hardly to be believed, by those not accustomed to such observations and inquiries, how great a tract of country might, in twenty years, be improved.

Planting colonies of foreigners upon wastes, has been a favourite method pursued in several countries, particularly in Spain and Russia; such speculations have rarely answered the immense expenses bestowed upon them. The lands are usually but half improved; the husbandry introduced is almost sure to be bad; and the jealousy with which the new settlers are viewed by the natives, prevents their practice from ever being imitated. Such a mode of improvement, as is here sketched, would be infinitely more beneficial; what was done would be well done; all would be executed by natives; for the only foreigner employed in the business should be the director. There would be no probability of the improvement not being durable and spreading widely; for the lands not being let until the cultivation was completely in train, the profits as well as the method would be seen by every one.

By executing the improvement of a waste on these principles, ten thousand pounds would have an infinitely greater effect than a hundred thousand expended in any other method: in the German colonies, established in the Sierra Morena in Spain, and in various others in different parts of Europe, much attention has been paid to the establishing of little farms only. I do not want to view such, to know that the improvement is beggarly, and the husbandry contemptible: no waste can be really improved, and to the best advantage but by means of the sheep, powerfully applied; all other methods are costly, slow, and of weak effect; but no little farmer can have a flock sufficient. This paltry idea of establishing nothing but little farms, is the result of most impolitical ideas respecting population, which ought never to be the object of a moment's attention. If it exist idle, or beyond the proportion of employment, it is the source of poverty and wretchedness; it is valuable only in proportion to regular and active employment, and you will have an industrious active population in spite of every obstacle. But small farms and little divisible properties, increasing the

people, without increasing employment, has no other tendency than to propagate idle beggars, and to disseminate modes of husbandry, calculated to exhaust the land, and keep its cultivators in misery. This is not theory but fact, of which almost every province, in France, abounds with glaring instances. But of this more in another chapter.

There is another sort of waste land, that abounds also very much in France, I mean marshes: it is asserted, that there are from 1,200,000 to 1,500,000* arpents of them in France. The improvement of these is vastly more expensive and more difficult than that of *landes*, heaths, moors, &c. The drains demanded for them require a considerable capital. These ought to be converted to meadow and rich pasture, by means of draining. Where they admit it, the cheapest improvement of such is by irrigation; the general drainage of great marshes, if not trusted by the assemblies of the departments to the conduct of some one able director, should be done by commission by constituting a company, as in England, and paying the expense, by a tax on the lands drained. If the rage for small farms continue, these marshes, in proportion as the soil is boggy, will admit of being divided into small portions, that is, of 30 to 60 arpents, but it should be under an absolute prohibition of the plough. The bog, which I saw in passing from Auvergnac to Nantes, and which seems, from its appearance on the map of Bretagne, to be of a vast extent, is highly susceptible of improvement, and every acre of it might be converted into rich meadow.

LUCERNE IN FRANCE.

From Arthur Young's Agricultural Survey of France.

PICARDY—Boulogne.—Last twelve to sixteen years; three cuts, very fine and thick; sixteen pounds of seed per measure, about an acre; four or five horses kept for five months.

Breteil.—Value it more than corn; three cuts; in spots four feet high; lasts ten years; first cut for horses, the rest for cows.

ISLE OF FRANCE—Arpajon.—Much; three cuts.

ROUSSILLON—Bellegarde.—Watering shortens its duration; give it water every eight days when there is no rain.

Perpignan.—Watered lucerne in all the bottoms.

Pia.—By far the richest crop, and most profitable culture; it is sown largely on two sorts of land the dry stony poor soils that are watered, and also on the rich deep friable loam in the vale between Pia and the calcareous northern mountains, which are not watered; in all cases it is sown broadcast and without corn. It is cut, for the first time, the end of April; and, if watered every forty days afterwards, to the amount of five cuts in all; if the land be not watered it is cut thrice with a full product; and a fourth time with an inferior one. If watered it does not last above seven or eight

*Rapport du Comité d'Agriculture, &c. 7 Fev. 1790. par M. de Lamerville, député de Berri. p. 3. De la Nécessité d'occuper tous les gros Ouvriers, 1789, par M. Boncerf. P. 3.

years, but in other land twenty and even thirty years; the hay is preferred to all others; a minatre is worth 6 louis at four cuts (5*l.* 9*s.* 4*d.* per acre); I walked over many fields of it, and found the crops beautifully clean and luxuriant, of a complexion and product very different from what is ever seen in England, but not equal to that of Barcelona in height by a third. Perpignan to Villa Franca, take three crops of wheat after lucerne.

Sijean.—Yields two cuttings in dry years, and four in wet ones; lasts ten years.

LANGUEDOC—Caussan.—Fine; under mulberries; from thirty-six sesterées get an hundred septiers of seed; the sesterée is sown with 100 lb. of wheat; the price last year was 50 liv. the septier. Vale land under lucerne lets sometimes at 40 liv. to 72 liv. the sesterée; corn land only 15 liv.

Pezenas.—Lucerne every where; lasts ten or twelve years; is excellent for every thing except sheep, for which animal it is too fattening.

Pignan.—Sow 15 lb. the sesterée; always alone; cut five times a year, and lasts fifteen years, yielding 1200 lb. dry hay each cutting; and the seed of a sesterée has yielded 100 liv.; the present price of the seed is 45 liv. the quintal, and of the forage 40*s.* When it is weedy they clean it by ploughing in the winter with a narrow pointed share, choosing frosty weather, which kills the weeds, but not the lucerne; an admirable practice, and apparently the origin of Rocque's harrowing, if it extend into Provence, his country. When it is worn out, their conduct is no less excellent; greatly as it improves the land, they do not venture to sow wheat, but barley and oats for hay, not corn, for two years in succession; a great deal of lucerne, pushing from the old roots, would considerably injure any corn, but add equally to the value of a crop of forage, as they call it; and the mowing early cuts off abundance of weeds; after these two crops they sow wheat, which proves very fine.

Lunel.—Much lucerne, but not fine, for the soil is inferior.

Carcassonne.—Cut it four to six times, according to rain; lasts 10 to 14 years.

GASCOIGN—St Vincents.—Cut in good years thrice, in bad ones twice; much over-run with couch.

Fleuran.—A few small pieces used for soiling horses.

Estafort.—Cut four times for soiling horses, and it is the best food of all for them.

Landron.—See a small piece of lucerne, but no other in the rich vale of the Garonne.

POITOU—Poitiers.—Lasts fifteen years; use it both for soiling and hay, which is better than that of saintfoin.

TOURAINE—Chanteloze.—The Duc de Choiseul's cows always tied up the year round; in summer soiled on lucerne, which gave cream and butter of the very finest flavor.

Blois.—Pieces of it on a poor and almost blowing sand; lasts five years; cut it thrice; and the produce more valuable than corn.

Orleans.—Lasts eight or nine years, and is cut thrice.

ISLE OF FRANCE—Petiviers.—Lasts twelve or fifteen years.

Melun.—Much here; lasts ten years; it is cut thrice, and the produce more valuable than wheat.

Yersaint.—Cut thrice; the first yields 400 bottles of hay; the second 200; the third 100; in all 700 (about 4 tons per acre), and the selling price 20 liv. the 100; or 140 the arpent. The finest of all their corn crops are those which succeed it.

To Montgeron.—It is the best feature of their husbandry. Sow 22 lb. of seed per arpent, with oats. It lasts twelve years. The price, at present 20 liv. the 100 bottles. When they break it up, they sow oats, and then wheat, getting by far the finest crops they ever experience.

Liancourt.—Cultivated in considerable quantities. Sow 30 lb. of seed per arpent, at the average price of 20 to 24*s.* the pound. Mons. Prevost a very intelligent and understanding farmer in the vale of Catnoir has remarked a great difference between the seed of Provence, &c. which is commonly sold in the north of France, and their own. The former rarely succeeds so well as their own, which he attributes to the great difference of the climate: with their own seed they never fail.—The general custom is to sow it with oats. It lasts with tolerable management, ten or twelve years; but on a rich deep soil, on a dry bottom, it has been known to reach the duration of twenty years. To destroy the weeds which arise in it, they harrow it partially with iron toothed harrows, and manure it with rotten dung. It is always cut three times a year, and sometimes four; but that is not common: a very good arpent would let at 150 liv. a year, which is more than any other production in the country. The finest of all may give 1600 bottles of hay, each of 12 lb. or 19,200 lb. which is above seven tons the English acre. In general the crop may be reckoned at 500 bottles, at two cuts on a mine, or 1000 the arpent, which is 12,000 lb. or better than five tons per English acre. The price of it does not equal that of good common hay; nor is it reckoned so good for horses. At present it is not worth more than 20 liv. the 100 bottles; they save seed of the third growth, and reckon 200 lb. per arpent a middling crop. Seeding does not destroy it: on good land it is just as good after; but sometimes on poor land it is injured. A vast object in the culture is the great improvement it works in the land; when they plough it up, they do not venture to have wheat, as the luxuriance would be such that the product would be all straw. They take two, three, four, and even five crops of oats in succession, which are prodigiously great; and when the oats decline, they sow wheat, and get a very fine crop!

Marenne.—Lasts twelve to fifteen years; cut thrice: when ploughed up, sow two crops of oats, and then wheat, all sure to be excellent.

Pontoise.—Near the town half the land is under it.

Brasseuse.—Commonly sown with oats that succeed wheat, and often upon one ploughing only; yet such is the happy texture of the soil, a fine friable sandy loam, that it succeeds tolerably well, and would, with better husbandry, yield an immense advantage; it lasts ten or twelve years, and longer when taken care of. They cut it thrice a year. It yields, at the two first cuttings, 300 or 400 bottles per arpent of hay fit for horses, and the third is for cows. Madame la Viscountess du Pont, sister of the Duchess de Liancourt, has possibly more lucerne than any other person in Europe. She has 250 arpents 80 of which were mowed this year. I saw the hay, and never met with better

or sweeter, yet bottled from the field in the method universal in France. She was so good as to inform me, that no food for cows yielded finer butter; I tasted it, and none could be better flavored.

Dammartin.—Much; lasts nine years; cut thrice, unless for seed, in which case, twice only. The first cutting yields 400 or 500 bottles; the second half as much. The Archbishop of Aix, who has an abbey in the neighborhood, has taken great pains to spread the culture, and has occasioned near 800 arpents being sown.

Soissons.—Lasts eight or nine years; cut thrice; yields at the first 300 bottles of hay, of 12 lb.; at the second 250; and at the third 100 per arpent, of 96 perch, of 22 feet, 46,464 feet (3 tons 3 cwt.)

Artois—Recousse.—They have some; cut thrice; lasts twelve to fifteen years, and reckoned excellent.

NORMANDY.—Coutances.—In the way to Granville many patches, the first I had seen in Normandy, and they increase to pieces of some consequence; lasts twenty years, and is constantly cut thrice.

La Roche Guyon.—Much cultivated; the Duchess d'Anville has fifty arpents, and a farmer in the neighborhood forty-seven; and I saw some good pieces in going to Magny; it is cut thrice, but does not last more than six years; sow it with oats; when broken up, they take three crops of corn in succession; in the open fields every body turns into it the last of November.

ISLE OF FRANCE—Nangis.—Seed 20 lb. an arpent de Paris, at 12 to 20s. the pound (26 lb. the acre); sow it with barley or oats that follow wheat; lasts six years, if manured, eight; a good arpent yields three hundred bottles the first cut (1 ton 14 cwt. per acre), two hundred the second (1 ton 3 cwt.), one hundred the third (11½ cwt.), each of 10 lb. (in all 2 tons 8½ cwt.); some sown alone on a clean fallow in August, and this is by far the best; the hay 20 to 30 liv. the hundred bottles (2l. 3s. 8d. a ton); if let it be at 40 liv. (2l. 2s. per acre); when they break it up, two crops of oats, and then one of wheat, and all good.

Meaux.—When oats have two leaves, they harrow in the lucerne seed 20 lb. per arpent (100 perch 22 feet) (17 lb. per acre); the price per lb. 4 to 10s. usually 6s.; the first year it produces, the first cut, but one hundred bottles per arpent, afterwards four hundred (2 ton 2 cwt. per acre), some five hundred, each of 12 to 16 lb.; the second cut two hundred (1 ton 1 cwt. per acre), the third one hundred (10½ cwt. per acre), in all 3 tons 13½ cwt. the hay of the first cut is given to horses, the second to sheep, and the third to cows; it is never manured; but the soil is a deep rich loam, that is to be ranked among the finest in the world; couch is the greatest enemy to it; they never use it in soiling, but always for hay; for mowing, making, cocking, and carting, 10 liv. the arpent; all is bottled in the field. They are now (July 3,) mowing the first growth, but some has been cut some time; nothing, they say, improves land so much; all the good oats that Mr. Gibert showed me, at Neufmoutier, were after lucerne; the difference between those, and the other crops after wheat, being that of yellow and green.

DAUPHINE—L' Oriol.—Prepare for it with the spade, at the expense of 12 liv. the septeerée; dung well; lasts five years; after that time, if they would preserve it, they plough it across with a little

plough, called a *binet*, to destroy the grass, and then it succeeds for two years more. When they break it up, they take five crops of wheat in succession. I expressed my amazement at this execrable management; and Mons. Faujas de St. Fond attested the truth of the fact. If wild oats came the third year, they sow oats or rye instead of wheat, on that account.

PROVENCE.—Avignon.—Much; it is usually sown alone in March, 5 lb. of seed per eymena of 21,600 feet (10 lb. per acre); cut four, five, or six times, and lasts seven or eight years if much watered, ten or twelve if less; they then plough it, and find the amelioration so great, that they take five, six, seven, and even eight crops of wheat in succession! But, bad as such management may be, it is not, however, to be classed with a similar rotation among us, for water works miracles: and the wheat harvest is so early, that it affords time for what they please. Lucerne suits light rich land best; the produce at every cutting twenty-five quintals (3 tons 3 cwt. per acre); but for this it must be dunged as well as watered, which must be done in winter, after the frosts are gone; if no dung fifteen quintals (1 ton 5 cwt. per acre); the price 40 to 50s. the quintal, being 10s. below meadow hay. They reckon the hay bad for horses, blowing them up too much, but excellent for all other animals: I saw some of it at Avignon so beautifully green, that I felt it to ascertain if it were really hay, and not, as my eyes told me, fresh cut; it is sometimes let, and rents from 20 to 60 liv. the eymena (60 liv. is 4l. 12s. 9d. per acre); at five cuttings the produce per acre in money is £21. 13s. 2d.

Hyerès.—I viewed a new plantation making by Mons. Battaile; the piece contained one and a half acre English, and he was working it at the following expense: First digging, 96 liv.—Burning roots, weeds, clods, &c. 96 liv.—Dunging 120 liv.—Second digging, 96 liv.—Seed, 60 liv.—Total, 468 liv. or 13l. 13s. per acre. It was left quite smooth and fine to the depth of a foot, free from every sort of root weed, and laid in beds ready for watering, and now (September) sowing; next year he will cut it four times, afterwards five, and perhaps six; it will last fifteen years, and possibly twenty; could let it at 400 liv. a year (11l. 13s. 7d. per acre), and the produce gross 500 liv. (14l. 11s. 11d. per acre); and when broken up it will give great crops of wheat.

Observations.—The culture of the plant under our consideration, is one of the principal features of French husbandry. We have gone to the French school for the culture of it, yet it is ill managed, and with bad success in England, and has been so in every period; but in France, even in climates similar to our own, it is an object of almost uniform profit; and it must therefore be unfortunate indeed, if we do not extract something from the French practice deserving our attention and imitation. The first leading circumstance that demands our attention is the unvarying practice of sowing it broadcast. The lucerne in Spain which is of a luxuriance we have no conception of, and the little I have seen in Italy, is all sown in the same way; a contrary practice, namely, that of drilling has very generally taken place in England; it has been repeatedly urged, that the humidity of our climate renders hoeing necessary to keep it free from the spontaneous grasses; and, if

hoeing is necessary, drilling is certainly so. But this necessity is not found to take place in the north of France, the climate of which very nearly resembles our own. After some years, those grasses destroy it there as well as here; but the French think it much more profitable when that happens to plough it up, than to insure a longer possession by perpetual expense and attention.

A Frenchman from Provence (Rocque), introduced this broadcast culture of lucerne, about twenty-five years ago into England: I saw his crops, which were very fine, and equal to any in the north of France. Mr. Arbuthnot, of Mitcham had it also in the same method on a large scale, and with considerable success; other persons have succeeded equally well, whose experiments may be found in the registers of my agricultural tours through England; the method, however, has not been generally pursued; and the little lucerne to be found in England is chiefly in drills. It certainly deserves inquiry, whether this is not the reason of the cultivation at large not having made a greater progress with us. The introduction of hoes and horse-hoes among crops that are cleared but once a year from the land, and with no necessity of mowing them close to the ground, appears to be much easier, and more practicable, than hoeing and horse-hoeing a meadow cut and cleared thrice in a year; and which must of necessity be mown quite closely. The preceding minutes seem to allow the conclusion, that the drill is not necessary for this culture; the broadcast succeeds well in every part of France, in proportion to the goodness of the soil and to management, like every other crop.

I wish not to make this a didactic work, or I could offer hints that might be of advantage possibly to the culture in England; I should apprehend that a turnip or cabbage fallow is the right preparation; if the field be foul for two years in succession, fed on the land, sown with barley or oats three-fourths the common quantity of seed, say two bushels; should weeds appear the first year, I would bestow 10s. per acre in drawing, weeding or otherwise extirpating them; and after that the lucerne should take its chance. Explanations are endless; a hint is sufficient for the practical husbandman, without prejudices: I would never manure till the crop was two years old.—Its ameliorating effect is a singular feature in the preceding notes; the accounts are such as will surprise some persons; but where husbandry is not very well understood, effects so remarkable must be estimated with caution; and it may, without danger of deception, be admitted, that a material reason for this apparently exaggerated merit is, that fallows are the common preparation for wheat. If the French were well acquainted with the culture of clover as a preparation for wheat, nothing very marvellous would be found in lucerne. The intelligence at Pinjan indicates, in this respect, a conduct that is truly excellent; taking a tillage crop of fodder, winter tares for instance, on the first breaking up, is a practice that merits the greatest commendation.

THE WONDERFUL CALIFORNIAN WHEAT.

As we expected, and as our readers might have inferred from our remarks on this (not new, but revived) capital subject for the operation, the Californian wheat humbug has been started, with as sanguine expectations and efforts, and as fair appearance of success, as if it were the earliest, instead of being the latest humbug, and as if this wheat itself had not been already several times before the public, and cried up as a wonder of productiveness; and, when its worthlessness had been established, the subject dropped, to be forgotten, and remain unknown, until brought forward again, for a new race, to end in like manner.

The American Farmer, of Sept. 30, contains an account of this wheat, and an engraved representation of a head; and a wonderful head it certainly is—a whapper—big enough to induce, by the publication of this picture alone, a hundred orders to be sent to the proprietor and salesman, unless he has spoiled his market by fixing so very low a price as five dollars for each head of wheat. This is surprisingly low—indeed, dog-cheap—for a wheat which (according to the statement copied in our last number) produces at the rate of 230 bushels to the acre on poor sandy land, without manure.

While the sheet containing our remarks on this wheat was passing through the press, we received the letter which will be copied below, (omitting the writer's name,) accompanied by two heads of the Californian wheat, which we declined receiving under the conditions proposed. The ears were not to compare, for size, with that afterwards pictured in the American Farmer. The few short or secondary heads shooting out at the lower extremity of the principal and upright head, were in the same plane with it, and not surrounding it, as appears in the engraved representation, and as in the Egyptian wheat, of which we witnessed a fair and fully extended trial some thirty-five years ago. But notwithstanding this small difference, we have no doubt that the Californian and Egyptian wheat are the same, or from the same original stock; and we know that the latter is not only no monster of productiveness, but that it has been abandoned, as worthless, by all who tried it. At pages 51 and 52 of Vol. vi. of Farmers' Register, we gave, as one among sundry other humbugs, a conspicuous place to, and a full account of, the real and well ascertained character of this Egyptian wheat. But all the exposure that can possibly be thus made, in advance, will not kill or even cripple a humbug, much less cure the prevailing disposition of many of our countrymen to pay for their own personal experience therein. The article in the American Farmer (a letter to the editor) is as follows:

"I avail myself of the polite offer of our friend Gen. Steuart, to transmit to you an extract from a letter received by me this morning, from my early friend Alpheus Baker, esq., of Abbeville, South Carolina, a gentleman whose statements are entitled to implicit confidence :

"The wheat to which you allude was brought to this place from the Osage nation, by Col. Spieren, who had been sent to them as a commissioner by the president of the U. S. Mr. S. brought seven heads ; he gave me one : I offered him \$5 a head for the other six, which he refused ; but afterwards gave them all to me, to cultivate, and give him one-half of the crop, which I have done. I sowed the wheat on the second day of January, 1840, in my garden, in drills 18 inches apart in the drill. I believe every seed came up, and each seed produced a stool of from 20 to 50 stems or straws. Each head of wheat contains from 100 to 150 seeds ; I forgot to tell you that the original head that Mr. S. gave me was not planted ; that it was overlooked ; and that I have it yet. There were about ten thousand heads produced from the six planted. The wheat was planted at least six weeks or two months too late ; and some of it was injured by excessive rains and storms ; but all who saw it agreed, that it stood the stress of weather better by far than any wheat in the country. They all agreed that, as a wheat, it was, when grown, indescribably grand. We sell the wheat at five dollars per head. If you think it would be a desideratum in your state, I will send you 1500 or 2000 heads."

"My friend has accompanied this statement with the accompanying drawing of a head of the wheat in question, and subjoins a note that the grains are large and fair. As he has consulted me on the expediency of offering the seed for sale in Maryland, you would much oblige me by stating, at your earliest convenience, whether you think our farmers would be forward to any considerable extent in making so costly an experiment. Your obedient servant, WM. GEO. READ."

The next succeeding number of the American Farmer (Oct. 7) contains a letter from Dr. Gideon B. Smith, in which he, at considerable length, gives satisfactory reasons for pronouncing this "new species of wheat" to be identical with the often before exploded humbug, Egyptian wheat. He closes his remarks on it by saying—"During the twenty years of my agricultural experience it has been presented to my notice at least twenty times."

But to our own concern in this matter—or what it might have been—as will appear from the following letter, referred to above.

"—— County, Va. Sept. 24, 1840.

"Sir,—I have not had the pleasure of being personally acquainted with you, but know you from character, and have taken the liberty of sending you, by Mr. ——, two heads of the California wheat, which I consider very valuable, and for which I paid five dollars per head. You will see the terms I let it out upon, and if you feel disposed to take these two heads on the same terms, I should be glad for you to do so, as I have

no doubt if you do, that you will take particular pains with it, and give it a good chance. I have no doubt, if it should grow as well in this country as it did where I saw it, that it can be sold readily next summer for one dollar per head, or perhaps more ; that however has to be tried. They planted six heads of this wheat in rows 18 inches apart and about a foot between each grain, and raised 9500 heads, some having as high as fifty heads from one grain. It ought to be planted in next month, I think, in your section. If you are willing to plant these heads on the terms specified, copy the agreement, or sign this, and send it by mail to —— Virginia. Yours, &c. Very respectfully, ——."

[Blank bond enclosed.]

"Know all men by these presents, that I, Edmund Ruffin, of the town of Petersburg, have this day received of A. B. of the county of —— and state of Virginia, two heads of the California wheat, which I obligate myself to plant, and the increase of said wheat for two years, provided it should not all be sold the first year. I also agree to use every exertion to sell the increase of the said wheat, and I bind myself, my heirs, assigns, &c. to pay over unto the said A. B. or his representative at any time when called upon, one half of the proceeds of the increase of said wheat (i. e. whatever I may have sold) for two years, and render unto the said A. B. a list of those persons to whom sold. The said A. B. shall have the privilege of regulating the price of the said wheat, if he shall think proper. In case the said A. B. should at any time desire his half of the wheat raised either year, he or his representative shall have it on application, unless disposed of before by myself. Given under my hand this day of 1840."

Now, putting aside all other possible objections, which might have prevented our entering into this proposed agreement and copartnership, we really think that the proposer has asked and expected too much. In the first place, besides all the *superlative* care, and garden culture, which most other persons might as well execute as we could, he doubtless made a *proper estimate* of the advantages of our editorial character, which would give the greatest facilities for puffing, indirectly advertising, and selling a humbug article; and, in such a matter of business and bargain, we certainly ought to be paid for this item of advantage. Let us make an estimate, on his own grounds of expectation, as to price, and, for product, of the crop to which he refers, and see what an enormous price we should pay, and our partner receive, for his investment of two heads of wheat, and our nursing care of the products.

Taking the average of the statement of number of grains, copied above, these two heads, at 125 grains each, might have had 250 grains in all. Suppose, as in last crop, "every seed came up," and produced 20 to 50 stems, say average 35, (which, by the way, is not a very extraordinary product—as any common wheat may do as much,

under like treatment—) and each head to produce as before. Then 2 heads $\times$ 125 grains = 250, planted this fall will produce 250 clusters $\times$ 35 stems = 8750 heads—which if sold (by means of our editorial facilities for puffing) at the minimum of our correspondent's expectation, or at one dollar per head, would be \$8750; or \$4375 paid to him, clear of all expense and charge, for his two heads of wheat only. He will, from this, clearly perceive the injustice of the proposed arrangement, and that we would do much better to buy his two heads, even at the high price we advised in our last number, one dollar per grain, and then carry on the trade in planting, puffing and selling, upon our own bottom alone.

But this estimate does not go half way. Our "every exertion" was to be made for *two years* to cultivate and sell the product. And as our proposed partner was (by the bond) to have the right to fix the price, and thereby could thus restrict the number of the first year's sales, and consequently extend the quantity of the second seeding as much as he pleased—and as no one will suspect him of the folly of wishing to "kill the goose that lays the golden eggs" for him, let us suppose that he refuses to sell more than half of his first crop, (the concern receiving but \$4375 the first year,) and therefore, that we should have to plant the remaining 4375 heads (we like to be exact in statements of things so precious,) and let us suppose the rate of product to be only half as much as before, and the price of the crop to be reduced to 25 cents the head, or, combining reduction of rate of product and price, to one-eighth of those of the first year. Then 4375 heads $\times$ 125 grains each = in product 546,875 clusters, $\times$ 17½ stems (half the previous product,) = 9,484,375 heads, which, at 25 cents per head, would amount to two millions, three hundred and ninety-two thousand, one hundred and sixty-five dollars, of which one half would be the share, and all net profit, of our proposed partner. We trust, therefore, that he will see the unreasonableness of his offered terms. For our part, we must frankly declare that we would almost as soon undertake to carry on the Florida war at our own expense, (provided we were to be sole contractor, as well as paymaster and commander-in-chief,) as to raise wheat for our correspondent, on the terms he has proposed.

ON MAKING OF MANURES.

By Colleton.

From the Southern Cabinet.

Mr. Editor,—I am surprised and astonishing at the improvement that is every day making in every branch of agriculture by the up-country planter, except that of the manuring system,

which my experience has taught me ought to be the first object or of primary consideration on an up-country farm.

I cannot charge my neighbors with not knowing the advantages of manure, for it must be perceptible to the most careless observer. They all know it, and they all acknowledge it, yet, strange as it may appear, they all neglect it in a greater or less degree.

I have often been at a loss for a reason of this strange inconsistency, and have arrived at the following conclusion: The most of our up-country planters have too much land, and they can and do make tolerable crops without manure. I have special reference to their cotton crops. I know most of them manure part or all of their corn, but they do it with cotton seed, for which they deserve but little credit, as they are compelled to remove them out of their way, and the additional labor of applying them to the corn is very trifling.

I speak with a degree of confidence when I say, that within the circle of my knowledge, which embraces a considerable extent, there is not one out of ten who plant eighty acres of cotton, that manures ten acres out of eighty. The reason of this I believe to be, as I stated above—they have too much land. Most of our up-country planters plant from ten to fifteen acres of cotton to the hand. I feel confident from my own experience, when I say, if they would plant half of that number of acres, and manure them, the amount of their crops would be as much, or more, than they are now, or according to the present manner of culture. I state, from actual experience, when I say, that our up-country or pine-lands, when manured, will produce double the quantity of cotton. Perhaps it will be said, all this we freely admit and firmly believe, but how are we to make so much manure? In the first place the making of manure must be a separate and distinct business otherwise you will not be able to do it to advantage. Do not put it off for wet days or broken time. Too many have tried it in this way, and have invariably failed.

Put so many negroes with wagons and mules to collect trash,* and haul it into your cow-pens, stables, and hog-pens, and let the same hands haul it out. When it has been sufficiently trampled, two hands with a wagon and a pair of mules can rake and haul six wagon-loads of trash per day; that would be eight hundred and eighty-four wagon-loads in six months, and every one hundred wagon-loads of trash will make two thousand bushels of manure after it has been in the cow-pens six months, as two thousand bushels of manure to every one hundred wagon loads of trash would be seventeen thousand two hundred and fifty bushels of manure to eight hundred and eighty-four wagon-loads of trash. Seventeen thousand two hundred and fifty bushels of manure will manure forty-three acres of cotton, allowing four hundred bushels to the acre. I will now appeal to the planter to say, whether his two hands, with his mules and wagon, could make more, or be employed more profitably; and he may value the manure at six cents per bushel. He will remember to take into consideration the annual improvement of his farm by pursuing this system of culture.

*Leaves &c. which cover the ground in wood-land.—
Ed. F. R.

If the above is worthy of a place in your *Cabinet*, it is at your service.

Yours, respectfully,
July 1840.

COLLETON.

NATIVE NITRATE OF SODA.

From the Proceedings of the Boston Society of Natural History, 1840.

Dr. M. Gay read the following communication from A. A. Hayes, Esq., of Roxbury, on the Native Nitrate of Soda, found in South Peru.

The existence of beds of Nitrate of Soda in Peru has been long known, and the inhabitants of a most arid and desolate region have made it by simple operations an important article of commerce and manufacture.

This salt has claims of scientific interest quite equal to those of any mineral hitherto discovered. It indicates to us, who are accustomed to a humid climate, with heavy rain storms, a state of atmospheric dryness, as far removed from our experience as the singular products there deposited are from our own rocks and soils.

During the scientific tour of Mr. John H. Blake, of Boston, a great number of specimens, illustrating the forms and composition of this salt, were collected, and I have been able to learn some facts from the chemical examination of them, but have to regret that the loss of Mr. Blake's journal has prevented our having a full account of their geological relations.

The nitrate of soda exists in large beds, a few feet below the saline soil, or forming that soil in various places, from Arica on the north and west, to the course of the river Loa on the south. The country is an elevated pampa, having the form of a shallow basin, bounded by the coast cliffs on the west, by the higher pampas on the north, by sandstone hills on the east, and the ravine through which the river Loa falls into the sea on the south. The elevation of the pampa of Tamarugal in the province of Tarapaca is nearly 3300 feet above the level of the Pacific.

The western border or coast presents granite, on which the pale flesh colored feldspar porphyry, peculiar to volcanic regions, reposes. This rock is doubtless trachyte, and its extent and volcanic character make it one of the most important of known rocks. Imbedded in the soil and forming extensive tracts, are shells of the same species as those now existing in the ocean. A saline soil and other appearances denote that a long line of coast has been elevated from below the ocean's waters. In travelling north, Mr. Blake found that the pampas were broken by ravines, through which the waters from the Cordilleras flow at times. A remarkable feature is disclosed by these ravines; a section always presents a higher level on the north than on the south side, so that each pampa presents a *steppe*, rising as we advance northward. The sandstone hills forming the eastern boundary are of moderate elevation; they contain beds of gypsum, and form the western barrier of another basin, the eastern bounds of which are the Cordilleras.

The pampa is mostly uninhabitable, but spots where water can be obtained, and parts of the ravines are cultivated. Nearly midway between

the eastern and western limits of this pampa there exists a buried forest of large trees, mostly of the Algorabo species. The trees are inclined towards the southwest, and the wood is singularly well preserved. Specimens have the color and grain of old mahogany, but are brittle. The gaseous constituents of recent wood seem to have been lost, for although resinous, it burns without flame. From personal examination of the country, east of the sandstone elevations, Mr. Blake concludes that a lake of considerable extent once covered the space between these and the Cordilleras. Numerous volcanic rents now exist among the mountains, and it is probable that the saline matter produced by them was dissolved in the water, forming a lake at the base of the mountains. This lake subsequently broke its barriers, and prostrated a forest then growing where the saline matter is now found. I have carefully examined the earthy matter which is mixed with the nitrate of soda from different parts of the province of Tarapaca and find that the larger part is composed of fragments of finely powdered shells, the color being unchanged. A brown marl forms the remainder, such as results from the washing of sandstone, —these facts I consider as supporting the conclusion of Mr. Blake. The surface of the pampa is mostly sand, clay, and saline matter. The latter is composed of sulphate of lime and soda, salt, and nitrate of soda—some parts present the nitrate of soda at the surface—at others, a few feet below. These salts have all the physical and chemical characters of salts produced by decomposition and separated by evaporation from solutions. The nitrate of soda is found in distinct strata, a thin layer of brown loam separating the parts; it is also found mixed with salt, and forming a small portion of the whole mass. The refining operations are rude and simple. The richest masses of the native salt are blasted or broken and divided into small portions; with these, copper kettles are in part filled, and water, or the mother water of former operations, is added, and heat applied until a boiling and saturated solution is obtained. The solution is transferred to wooden coolers, where the nitrate of soda crystallizes. The undissolved salt remaining in the kettles is thrown aside, fresh salt being used each time, although not one half of the nitrate of soda is dissolved. The coolers are emptied after the crystals of nitrate have ceased to form; it is dried, packed in bags, and sent to the coast on mules. The wood used in the operations is transported from a distance on the backs of mules from the borders of the pampa. Of late, attention has been turned to using the altered wood of the buried forest, and some excavations promised a supply. Water is found by sinking wells in some places, below the saline soil. The subsistence of the workmen, drivers and mules, is mostly drawn from Valparaiso. The quantity of nitrate of soda which exists in beds is immense, and in addition it is probable that the saline soil would afford a large supply.

Native nitrate of soda, in fractured masses, has a granular structure, arising from the aggregation of irregular rhombic crystals, varying from fine grained to coarse grained. It is brittle, but yields more easily in one direction, separating into angular parts, resembling loaf sugar closely, in some specimens. Color varies from snow-white to reddish brown and gray. Some specimens have a lemon

yellow tint irregularly distributed; specific gravity, 2.290; taste, nitrous, with a cooling impression; odor, peculiar, and when warmed resembling chloride of iodine dissolved in water.

Composition of average specimens is nitrate of soda 64.98, sulphate of soda 3.00, chloride of sodium 28.69, iodic salts 0.63, shells and marl 2.60, =99.90.

Mixed with this mineral, I have found nitrate of potash, sulphate of lime, chloride of sodium, iodate of potash or soda, and chloriodate of magnesia, the latter imparting the bright yellow tint which some specimens show.

CHEMICAL COMBINATIONS—ANALYSIS OF SOILS.

From the Southern Cabinet.

Mr. Editor,—I frequently find information requested on the subjects of the following paper, which has been my inducement for making them the topic of a few cursory remarks.

Many have vague ideas of the components of the material substances of which we are formed and by which we are surrounded. Persons are often deterred from particular inquiry into the sciences, by the apparent magnitude of the difficulties, and the numerous intricacies they present at the entrance. These obstacles are analogous to looming highlands, which appear to obstruct the traveller's way, and impede his further progress but with resolution he advances, and ere he is sensible, the extent and richness of the scene shows him that he has already overcome a portion of the difficulty, and at least partially accomplished his object. In this as in all things "*ce n'est que le premier pas qui coûte*."

The various objects which surround us, and strike our senses, would appear to be a mixture of heterogeneous substances, of infinite complexity, but upon inquiry we are the more and more astonished at the fewness of the original materials, and the simplicity of the limited laws which govern their history. As far as we have knowledge, this tangible world is composed of about fifty-six, or fifty-seven, simple elements, or substances, each having peculiar and particular properties, which are throughout marked, constant, and invariable, and will be found in all parts of the world to act in a similar manner, when under like influences. These elements are not susceptible of annihilation or reproduction; they have been created once and for ever. Variety is produced by the combination in different proportions of these simples, for instance: sulphur, or brimstone, is a simple substance, from which art has succeeded in producing nothing but sulphur, and is formed of insensibly small particles, or atoms of itself. Iron, copper, silver, lead, gold, are other examples. These simples, when they do combine, are found to unite according to fixed laws, which are far from being complicated. Thus an atom, or proportion of sulphur, will combine with an atom, or proportion of iron, and form a compound with properties differing from those of either of its constituents. Again, under other circumstances, two atoms of sulphur will combine with one atom of iron, and form another compound, differing alike from either of its constituents, or the other combination. These two

substances combine in the two mentioned proportions only, and neither nature, or art, have produced examples of their combination in other proportions. Hence, a substance possesses properties differing, not only from the number of its elements but also from their proportions.

These simples are æriform, liquid, solid, visible, or invisible, and have different specific gravities. Gases will sometimes combine and form solids—again liquids, or gases, according to the temperature. One atom of oxygen and two of hydrogen unite and form ice, water, or steam, at different temperatures. The combinations known as calomel, and corrosive sublimate, so different in their action upon the animal economy; are results of different proportions of mercury and chlorine. The transformation of farina, or starch, into sugar, alcohol, and acetic acid, (or vinegar,) is simply a change in the relative proportions of the three sole constituents of all—oxygen, hydrogen, and carbon. The Emperor Napoleon was fond of the simple beverage, sugar and water. He remarked when made from sugar in lump, particularly if permitted to dissolve itself, it made a perfectly clear solution, but if the sugar was pounded the liquid was turbid. He asked of Chaptal, (a chemist of celebrity,) an explanation, who replied that the three substances sugar, farina, and gum, though composed in different proportions of the same simples, were so nearly allied that the abrasion caused an approximation of the sugar, to the nature of the other two substances, and farina being insoluble and gum less immediately so than sugar, the clouded appearance was caused by the suspension of the insoluble particles thus produced. The gas called carbonic acid, or fixed air, is a combination of five atoms of oxygen, and one atom of the well known substance carbon, which according to the arrangement of its particles presents the appearance of lamp-black, charcoal, and the crystallization diamond, all being susceptible of combustion, by which act they combine with oxygen, and produce the acid gas. Oxygen is found to combine in three proportions with iron, giving rise to compounds with distinct properties. Thus the magnetic oxide of iron, which occurs in the washes throughout this district, may be said almost to resist the action of acids, whilst the other oxides of the same substance combine with them with facility. Hence, the magnetic oxide is of less advantage in a soil than the combinations in other proportions, which correct acidity by saturation. In the fabrication of soap, if we place the carbonate of potash in contact with the grease, or oil, no soap will be formed, but if we previously divest the potash of its carbonic acid, (which is easily done with caustic lime,) the caustic potash produces a change in the proportions of the constituents of the grease, (oxygen, hydrogen, and carbon,) acids are generated, which combine with the alkali, and form the salt, soap. This informs us that if we fail to decarbonise our lie, we lose such proportion of alkali as may not have been deprived of its carbonic acid, during combustion, or by other causes, or having been deprived, has reabsorbed that acid from the atmosphere.

These elements, when they combine, do not unite in all proportions, but one is found to be a simple multiple of the other. Thus one to one, one to two, one to three, one to four, one to five, and rarely ever beyond this number, and never

in such proportions as one-seventh to one, or one-third to one-fifth, &c. &c. By reflecting upon these facts, and many more which might be here adduced, we shall realize the nature of atoms, their indivisibility, and the mathematical nicety in which substances chemically combine. This constitutes the basis of the Atomic theory, from which chemical equivalents, or proportions, are deduced, enabling the manufacturing chemist to calculate with the greatest exactness, the relative proportions of the different substances, he may wish to unite, to form the required product, and giving the analyzer the power of deducing the unknown from the known.

These simple substances variously combined, and these combinations variously intermixed, cause the different appearances which are presented to our senses in the vegetable, animal, and inorganic world. By taking advantage of our knowledge of the properties which these simple substances possess, as well as those to which their combinations give rise, we can form a pretty just conclusion of what will be discovered by accurate chemical investigation. To illustrate—we know that all vegetable substances are formed of three simples, viz.: oxygen, hydrogen, and carbon, and very rarely a fourth, nitrogen, which is found to exist in that product termed gluten, which may be extracted from the germ of wheat, to which add, the comparatively small proportion, of inorganic matter which is found in the ashes. Again, animal substances usually contain all the four first—I say usually, for there are exceptions to this as to all general rules, as grease or fat, (which is called the grossest part of the animal,) is closely allied to the vegetable oils, and formed of the same substances, neither containing the gas nitrogen;—therefore, so far as the constituents are considered they do not differ. The properties of the substances which form the mineral kingdom, are not the less distinctly characterized, and by physical inspection with the aid of chemical tests, the operator is enabled to foretell all the constituents which will be found by accurate chemical research. This analysis may be said to commence from the time an object first arrests attention.

These facts may appear to some elementary, but I hope on that account not useless, and that they, therefore, may be pardoned by those to whom they are familiar, for the service they may be to others who have less acquaintance with the subject. They may furthermore be of some utility in enabling some of my readers, the better to comprehend, the one or two examples of analysis, which I shall now add.

I shall select for the first example, a mineral substance, in which we will suppose it desirable to ascertain the quantity of carbonate of lime. The commencement of this operation is its reduction to a powder, (which indeed is the first step in every case,) and this may be accomplished in a copper, or iron mortar afterwards passing it through a fine sieve. Then, by means of a small sensitive hand balance, weigh say ten grains; by selecting a decimal number the calculation will be rendered more easy. This should be placed in a small platina crucible, of a size adapted to the quantity, on a few ignited coals, and brought to that degree of heat when redness is just becoming visible. It should now be removed from the fire, allowed to cool, and reweighed. By subtracting the num-

ber thus obtained from ten, you have the humidity. You now return the powder to the crucible, put on the cover, replace it on the fire and increase the temperature to a white heat, which should be maintained for about fifteen minutes. Suffer it to cool, and weigh. Subtract this from the last number, and it will give the quantity of carbonic acid driven off. It would be well now to ascertain by means of water, and acid, if this last operation has been effectual, and if it has not, it will of course be necessary to repeat the experiment on another equal quantity, till you have effected this end. Ten grains of the powder should now be introduced into a small glass matrass,* (for these operations those of the capacity of a gill, or half-gill, will be found most convenient,) cover it with water, and add a few drops of muriatic acid, from time to time, keeping up the action till effervescence ceases. If the acid be added too rapidly or too much at a time, the action will become so violent as to project a portion of the matter out of the mouth of the vase, in which case it will be necessary to recommence the operation on another like portion. In order to prevent any loss, the safest way is to incline the vase, that the spray may strike the sides. Towards the termination of the operation, the action should be aided by a gentle heat, and any excess of acid should be driven off by evaporation. The solution should now be diluted by the addition of water, and the whole thrown upon a paper filter, (which will retain the insoluble residuum,) and water added till every thing soluble is washed away. In washing, it is better to allow the water previously added to pass through entirely, before replenishing. If the water be hot, the operation will be more expeditious. You may ascertain if this is accomplished by receiving a drop from time to time, on a piece of glass and drying it over the fire, or in the sun; the washing is completed if it dries without leaving a spot on the glass.

The filter containing the insoluble residuum should now be carefully removed from its glass funnel, dried, and the matter separated, calcined, and weighed, or as it is scarcely possible to prevent loss in this way, it will probably be more accurate to calcine altogether, burn another filter of precisely the same size, and weigh the ashes, and make allowance for this in the weighing. To the filtered solution you now add lime water, until there ceases to be a precipitate. Lime being a strong base, will throw down bases of less strength. If no precipitate is produced by the lime-water, there is nothing in solution but lime, and the operation is terminated, and the quantity of lime may be ascertained by the difference between the weight of the insoluble residuum, and the powder which was deprived of its carbonic acid by calcination. But if there be a precipitate, the vase should be covered to prevent the absorption of carbonic acid, (which would unite with the lime and thus cause an error,) and when settled, drawn off clear, by decanting, or by means of a small glass syphon, and the precipitate collected on a filter and washed. By drying, recalcining, and weighing, and adding the weight of this precipitate to that of the insoluble residuum, and subtracting it from the powder

* A small vase, technically so called, much resembling a Florence flask. Those with flat bottoms are best.

deprived of its carbonic acid, as before remarked, you have the quantity of lime.

By reference to a chemical, or mineralogical treatise, the composition of the carbonate of lime will be found given.—Now let A. = the quantity of lime in 100 parts of the carbonate of lime, B. = the quantity of carbonic acid, and C. = the quantity of lime ascertained by analysis, then the simple proportion $A : B :: C : X$ = the quantity of carbonic acid necessary to saturate the quantity of lime found, which must be subtracted from the loss by calcination. To recapitulate—your analysis will stand thus—

Water,
Carbonic acid,
Insoluble residuum (usually sand and argile,)
Precipitate by lime water (usually magnesia, oxide of iron and alumine,)
Lime.

This mode is one of the most expeditious and easy that presents itself to my mind at this time. In this, as in all analyses, it is of course necessary that all the re-agents used should be pure, without which there can be no certainty or confidence in the results. If the muriatic acid should contain sulphuric acid, as it is likely to do, owing to the usual mode of manufacture, the insoluble residuum will contain the sulphate of lime, thus not only augmenting it at the expense of the lime, but also by the addition of the sulphuric acid. Manufacturers often make use of the chloride of lime to whiten their paper, which is frequently found to contain notable portions of that base, thus introduced, so much so as not unfrequently to produce effervescence, by the application of an acid. This substance would not fail to be dissolved, by the slight excess of acid unavoidable in manipulation, and would be thrown down and add to the amount of the constituents. This, in an analysis where the filtrations are numerous, would cause error; to avoid which the paper should be digested in weak acid, and washed to free it from all extraneous substances previous to use. Water is another frequent source of inaccuracy, if it be not pure. Distilled water is at all times preferable, or rain water (not collected from dusty roofs.) Sometimes the water of our rivers evaporates without residuum, as I have found occasionally to be the case with that of the Schuylkill. The operator will find it to his advantage to ascertain, by tests, the purity of the water and re-agents previous to use.

I shall now endeavor to enumerate the modes of separation which I should practise, were I about to examine a substance in which the constituents were more numerous. The following example is one analogous to many soils:—

Water,
Organic matter,
Carbonic acid,
Silica,
Alumina,
Oxide of iron,
Oxide of manganese,
Lime,
Magnesia.

I shall premise by observing, that where analysis can be performed without the use of fixed alkalis or their salts, as re-agents, it is always preferable, owing to the difficulty, (necessarily connected with their properties,) of freeing a precipitate of their

presence, which is more embarrassing in those which are gelatinous than others. The operation of getting rid of their presence is long and tedious but necessary—as without it there would be inevitable error, more or less flagrant, as the manipulation is more or less perfect.

The water or humidity will be driven off by maintaining the powder at the temperature of boiling water some time. The organic matter by heating the substance to a red heat, in contact with the atmosphere, and occasionally stirring it to make the combustion more perfect—the carbonic acid by calcination. The solution should be made with muriatic acid. A few drops of nitric may be advantageous. The silica and argile, dosed together, as in the foregoing analysis, and separated afterwards by an attack in a silver crucible with caustic potash, or in one of platina, with carbonate of potash. To the filtered solution you now add the carbonate of ammonia, drop by drop. The iron and alumine, (if there be any of the latter,) will be thrown down together, in which case they may be separated by potash. The separation of these substances by the carbonate of ammonia is a nice operation, as the success of the experiment depends on the exact quantity of carbonate of ammonia added. The manganese will be thrown down by the hydro-sulphate of ammonia. In this case you have the sulphuret of manganese. If the quantity be small the sulphur may be dissipated by roasting, but if large it will be necessary to dissolve in nitric acid, and precipitate by a carbonate. The lime will be thrown down by the oxalate of ammonia, and the magnesia by the phosphate of ammonia. The phosphate of magnesia being slightly soluble, may give rise to error if this be not taken into consideration.

I am well aware that in manipulation, however perfect the description, nothing will compensate for the want of practice, and even were it my intention to describe all that was necessary to one possessed even of partial experience, the idea would be preposterous in an article like the present.

If I have erred in any of the foregoing statements, which, however, I do not think will be found to be the case, I hope it will be considered a sufficient palliative, when I state, that I write without having in my reach a note, or scientific volume, to which I can refer.

C.
Abbeville District.

PEDESTRIANISM EXTRAORDINARY.

A most extraordinary feat of pedestrianism has been nearly completed by the celebrated Townsend, walking between this town and Prescott. This individual undertook for a bet of £50, to walk against time, the astonishing number of sixty-four miles each day, for six successive days. The great feat would almost seem impossible; but up to last night, he had regularly performed his day's task, with the exception of one day, in consequence of the Prescott police having taken him twice in custody, which retarded his progress considerably. On the following day, however, he made up for the loss he had sustained from the over caution of the "rural force," by walking seventy-two miles; and when it is considered that

this took place on the third day after he had started it cannot be looked upon otherwise than as wonderful.

In performing the given distance, he has to walk four times every day between the two places. As soon as he makes his appearance within the suburbs of Liverpool, he is constantly followed by great crowds (of whom he much complains) of anxious spectators, eager to look for once upon a man whose performance, when completed, will be one of the greatest feats of walking ever accomplished.

Mr. Townshend finishes his arduous task this evening; he will be in this town about 9 o'clock in the morning, half-past 1 in the afternoon, and 6 in the evening; he will then proceed for the last time to Prescott, and return to Liverpool at about half-past 10, which will complete this feat unparalleled in the history of pedestrianism.

Last night, when he arrived at Mr. Taylor's, Williamson-square, (at which house he has regularly slept, about five hours out of every twenty-four, going to bed at 12, and rising again at five,) he complained very much of his feet being sore, but his spirits seemed as buoyant as they were on the first day, (Monday.)—*Liverpool paper.*

CAUSES OF THE FAILURES IN REARING SILK-WORMS.

To the Editor of the Farmers' Register.

Fredericksburg, Sept. 1st, 1840.

The last number of the Farmers' Register contains (to me) unpleasant news relative to the general result of silk culture, in Virginia, during the past summer; but it is proper that these failures should be known, that persons intending to prosecute the business may provide convenient and proper fixtures, and exercise more care in time to come. Some of Dandolo's directions for the preservation of silk-worms' eggs are good, but others are unnecessary, and impracticable in our climate. As a specimen take the following:

"The linen cloths upon which the eggs are deposited may be left then in the same place, provided the heat of the room does not exceed 66° to 68°."

Now, where in Virginia shall we find a place free from dampness that can be kept at a temperature as low as 68° "in July or August?" The eggs from which my rearings were made the past summer were frequently exposed to a temperature, a short time after they were deposited, as high as 85° to 89°, and yet the worms proceeding from these eggs were more thrifty than any large parcel that I have seen. The hatching of a portion of the eggs was retarded by placing them in the ice-house the 10th of February, and another parcel were buried under ground, and these too succeeded well. But I am not yet sure that this plan will retard the hatching as late as the 1st of August, because a thermometer occupying the same situation, under ground, stood on June 27th at sunrise at 67°, and on June 29th, at 2 P. M., at 68°. The plan which I adopt for retarding the hatching differs in some respects from any that has hitherto been made public, and as it is proba-

ble that some of your readers may wish to try it, I will send you an accurate description in November or December.

I will state my opinion relative to the causes of failure in rearing silk-worms during the past summer:

1. Closing too many of the windows and ventilators of the room in warm and damp weather.

2. Crowding the worms so as to prevent their feeding with regularity, and which also checked proper transpiration. Hear Dandolo on this point. "It must be acknowledged that transpiration cannot exist without the contact of air. The health of animals requires that they should expel, by means of the excreting organs, the superabundant liquid and extraneous substances, which may have been introduced into their organization by nutrition."

3. Wide hurdles or shelves and narrow passages have been a fruitful cause of disease when in other respects the management may have been very good. These wide hurdles with narrow passages render it impossible to expel the large quantity of carbonic acid generated, with that uniformity and rapidity required to ensure health.

Hear Dandolo on this point also.

"The quantity of carbonic acid which is discharged by the silk-worms is in greater proportion when the worms are numerous, when the temperature is high in the laboratory, and when the atmosphere is laden with moisture. This same acid is well known to be heavier than the atmospheric air; and it would fill constantly the regions of pure air, which are in immediate contact with the silk-worms, if care were not taken to establish currents of air to expel it." (Note at page 265. London edition, 1825.)

The success of Count Dandolo in rearing silk-worms in 1814, when, as he says, "the crop of cocoons generally failed in Italy," is mainly attributable to the ample space allowed the worms, and the means which he possessed for a very free ventilation. This of course is nothing more than my opinion, and it may pass for what it is worth. These statements have reference only to cases where the worms were healthy when hatched. The best arrangement and management can avail nothing for worms from diseased eggs.

An opinion, that rearings of silk-worms are more precarious in large cocooneries than in small ones, has prevailed to some extent, both in Italy and in this country. In Virginia especially, this objection has been zealously urged by those who contend that the culture of silk cannot be pursued with profit on an extensive scale.

Facts stated by Dandolo stand in direct opposition to this opinion.

"In general the laboratories of the tenants, farmers and common cultivators, have the appearance of catacombs. I say in general, for there are some few, who, although they may not have all the requisites of rearing silk-worms in perfection, yet have care sufficient to preserve the worms from any very severe disease.

"I have often found, on entering the rooms in which these insects are reared, that they were damp,* ill-lighted by lamps fed with stinking oil,

* Some persons have supposed that closing the windows and ventilators in rainy weather protected the worms from dampness. This error has destroyed millions of silk-worms.

* Dandolo's treatise, p. 234. London edition, 1825. Vol. VIII.—78

the air corrupt and stagnant to a degree that impeded respiration, disagreeable effluvia disguised with aromatics, *the wickers too close together*, covered with fermenting litter, upon which the silk-worms were spinning. The air was never renewed except by the breaches which time had worn in the doors and windows; and that which made this seem more sad and deplorable, was remarking that the persons who attended to these insects, however healthy they might have been when they entered on the employment, lost their health, their voices became hollow, their hue pallid, and they had the appearance of valetudinarians, as if issuing from the very tombs, or recovering from some dreadful illness."—(page 303.)

"The silk-worms succeed better in the great laboratory, and form finer cocoons.

"The total result will show that the great laboratory is less expensive, and better overlooked, consumes less leaf, preserves the worms better from the attacks of disease, and affords an abundance and fine produce of cocoons." M. Dandolo observes, that having reared silk-worms, in large, middle-sized, and small laboratories, the cocoons of the large laboratories were *invariably* of superior quality. "Neither is it liable to breed so great a quantity of *carbonic acid gas*, or mephitic air, so peculiarly noxious to the silk-worm, as the small laboratory."—(Note, page 298.)

I have recently ascertained that the mortar or lime from an old building, when used as a surface dressing, will produce a growth of white clover. In the spring of 1838 a cart load of this compost was thrown on a piece of land that produced nothing but hen's nest grass, and a very feeble growth of that; in June last a beautiful growth of white clover covered the spot whence the compost had been shovelled off and applied to some trees a few steps distant. When I wrote you some time ago on the subject of marling this spot was overlooked.

LAYTON Y. ATKINS.

POSTSCRIPT.

Among the causes which have contributed to failure, in many of the attempts to rear silk-worms during the past summer, the retarding the hatching of eggs by ice-houses, or otherwise, may be named. The cause, however, of disease, must be sought for in the manner of retarding, or in the circumstances of the eggs, either before or after they were subjected to the process. If, for example, eggs had been placed in a refrigerator or ice-house in January or February, and the package containing the eggs was opened frequently in March, April and May, for the purpose of withdrawing portions for hatching or for sale, the condition of the remaining eggs would be changed by the sudden introduction of the atmosphere, so as to render it dangerous to subject them again to the full operation of the retarding process. My experiments, made the present season, prove that eggs may be safely retarded until late in June, full two months beyond the *natural* period for hatching. This period, in Virginia, in latitude 38°, varies from the 20th of April until the 15th of May. In 1836 it occurred the 5th of May, in 1838 15th of May, in 1839 5th of May, and in 1840 20th of April.*

If the winter state of the eggs may be prolonged until the 20th June, I think it fair to infer that it may be extended to July or August. Mr. McLean, of New Jersey, has succeeded in retarding the eggs until the last named periods. But this is an important subject, and time, with oft-repeated experiments, alone must furnish *facts* on which *positive* conclusions may be based. In the mean time a free communication of *facts* and opinions from persons engaged in rearing silk-worms is very desirable.

There is another cause which I believe has produced numerous failures in attempts to rear late broods of silk-worms, which deserves notice. In all early rearings it is well known that the worms and the leaves of the mulberry advance *simultaneously* towards maturity; and hence the worms have leaves suited to their different ages. But in many cases, when *late* rearings have been attempted, the leaves have been fed to the worms promiscuously, and consequently the *young* worms have been compelled to eat leaves not containing the kind of nourishment suited to their delicate organs when first hatched. I know it has been asserted that the young silk-worm will devour voraciously the toughest leaf; but because the worms will eat such leaves to escape starvation, it should not be inferred that it does no harm. A little reflection, I think, should convince us that it is unreasonable and unnatural.

The following quotation from an article translated from the French, and published in the Farmers' Register, tends to confirm the opinion expressed above.

"On the other hand, if the putting forth of the leaves is backward, and it is followed by heat that lasts long, as may usually be expected, and yet if but little heat is kept up in the laboratory, the worms will advance slowly and their growth will be prolonged. *Still the leaves grow and become harder, and have too much consistence for the worms, in their backward state.*" This, then, is a state of things in which the growth of the worms should be hastened by continued high temperature, in order that their progress may be brought up to that of the leaves, which is an essential point."

I will only add that the object of the French writer may be obtained without raising the temperature, or without the use of artificial temperature at all, viz.: by selecting the most tender and succulent leaves for the first ten days, reserving the toughest for the last age. I have pursued this course for *five* years, and have only had *one* late rearing that was diseased.

The hatching of silk-worms' eggs had been retarded until first of August in Italy, prior to the year 1778, and consequently is not a discovery of American ingenuity. The discovery was of no use to them, because the rearing of late broods was prohibited by the government, to prevent the destruction of the mulberry trees. (See Farmers' Register, vol. vii. p. 274.)

exposed to all the changes of the weather, in our cooconery during each preceding winter, with the exception of 1836. The eggs for that year had been kept in an upper room in Fredericksburg.

* These periods were ascertained by leaving eggs

SALT-WATER FISH NATURALIZED IN FRESH-WATER PONDS.

From the Proceedings of the Boston Society of Natural History, 1840.

Dr. Storer presented the following report on the fishes referred to him at the last meeting of the society.

The fishes presented to the society at its last meeting, as having been taken from the Jamaica pond, about five miles from this city, are the *Osmerus eperlanus*, common smelt. You may be surprised at the circumstance of salt water fishes being taken in a fresh water pond entirely disconnected with the sea. During the preparation of my report upon the fishes of Massachusetts, I learned from Benjamin Weld, Esq. of Roxbury, it was generally understood that the smelts found in Jamaica pond, were originally placed there by Governor Barnard. Investigating this subject, to procure some certain data, I met with the following extract, in a note, by Daines Barrington, the then vice president of the Royal Society, to a letter from John Reinhold Foster, "on the management of Carp in Polish Prussia:" "I have been informed by Sir Francis Barnard (the late Governor of New England) that in a large pool which he rented not far from Boston, and which had not the least communication with the sea, several of these fish, originally introduced from the salt water, had lived many years, and were, to all appearances, very healthy."* As I have never heard of this fish having been taken in any other pond in this neighborhood, there can be but little doubt that the "large pool" referred to in the above note, was Jamaica pond.† The specimens you perceive are considerably smaller than those purchased in our market—all that I have seen from this pond, for the last year, are smaller than those commonly met with. From the quantities yearly taken, however, they must have increased considerably in number; and their flesh has lost nothing of its sweetness or flavor, as I have repeatedly had opportunities of testing.

This is the only experiment, so far as I am able to learn, which has been made to transport marine fishes to fresh water, in our country. It has proved that this species can bear the change, and that it will increase in numbers in its new locality. In many ponds in our state more favorably circumstanced, better supplied with food, this fish would undoubtedly retain its usual size. In a highly interesting paper, entitled "Hints on the possibility of changing the residence of certain fishes from salt water to fresh—by J. MacCulloch, M. D., F. R. S.," we learn that this same species, the smelt, has been kept by Mr. Meynell, of Yarm, Yorkshire, in a fresh water pond for four years, having no communication with the sea, and they grew well, and bred as freely as under other circumstances.‡ In the valuable communication of Dr. MacCulloch, just alluded to, several other species of fishes are mentioned as having been trans-

ported in a similar manner, and he observes that the flavor of every fish has been improved by the change. "The sole becomes twice as thick as a fish of the same size from the sea. The plaice also increases materially in thickness: in some cases, it appeared three times as thick as in the sea. The barse also turns much thicker, and improves in delicacy. The mullet almost ceases to grow in length, but enlarges in breadth, and presents a much deeper layer of fat."* No one can give this elaborate paper, which I have merely referred to, a careful perusal, without being satisfied that our own ponds, many of them now utterly useless, may be made rich repositories of numerous marine fishes.

Several instances might be referred to of fresh water fishes being transported successfully, not merely to neighboring ponds, separated from each other by a few miles, but also from countries even in very different degrees of latitude. The *Cyprinus carpio*, common carp, originally from the central part of Europe, is now distributed through almost all its ponds, rivers and lakes—and I have previously stated to this society, that a pond in Newburgh, N. Y. was stocked with English carp.† The *Osphromenus olfax*, a native of China, has been introduced into the Isle of France, where it increases rapidly, and has been taken thence to Cayenne.‡ The *Cyprinus auratus*, so generally known as the gold fish, the native of a lake in China, in about the 30th degree of latitude, has been introduced and naturalized in the Mauritius by the French, where they now abound in the fish ponds and streams; they are completely naturalized, and are found in large numbers in many of the streams of Portugal, whence they are carried to England by trading vessels from Lisbon, St. Ubes, &c. in large earthen jars.§ It breeds freely in small ponds and even in tanks in England.|| Numerous ponds in Massachusetts abound with them, notwithstanding the severity of our winters.¶

The only instance with which I am acquainted of a fresh water species being removed from one sheet of water to another in this country, is that of the *Perca flavescens*, yellow perch; and for this successful attempt we are indebted to the zeal and perseverance of the late Dr. Mitchell, of New York, whose paper on the fishes of New York, published in the transactions of the Literary and Philosophical Society of New York,** is of great value to the American ichthyologist. He first published an account of his transporting the perch in the "Medical Repository,"†† and afterward referred to it in his paper just spoken of. From the original statement I extract the following remarks: "In 1790, Uriah Mitchell, Esq., high sheriff of Queen's county, and myself went to Rockonkoma pond, in Suffolk county, a distance of about forty miles, in a wagon. The object of our journey was to transport alive some of the yellow perch with which this body of water abounds, to Success pond, in the town of North Hempstead. We took about three dozen of those which had been wounded most superficially by the hook, and were so fortunate as to dismiss all of them but two into

* Philosophical Transactions Vol. 61, for the year 1771, p. 312.

† I have ascertained since writing the above, that Gov. Barnard's residence was on the border of Jamaica pond.

‡ Quarterly Journal of Science, Literature and the Arts, Vol. 17, London, 1824. Also, Yarrell's British Fishes, Vol. ii., p. 77.

* Quarterly Journ. Science, Lit. and Arts, Vol. 19.

† Silliman's Journal, Vol. 36, p. 342.

‡ Griffith's Cuvier, Vol. 10, p. 220.

§ Yarrell's British Fishes, Vol. 1, p. 316. § Ib.

¶ State Report on Fishes of Massachusetts, p. 82.

** Vol. 1, p. 422. †† Vol. 3, p. 422.

Success pond, in a condition vigorous enough to swim away. We were enabled to do this by filling a very large churn with the water of Rockonkoma pond, and putting so few fishes into it that there was no necessity of changing it on the road, and afterwards driving steadily on a walk the whole distance, without stopping to refresh either man or horse. In two years these fishes multiplied so fast, and became so numerous, that they might be caught with the hook in any part of the water, which is about a mile in circumference."

CREDIBILITY OF THE AGRICULTURAL PRESS.

From the Southern Cultivator.

It is in part the vocation of an agricultural press, to herald to a laboring and confiding class of honest citizens, all the improvements in the great art with which they are connected, as fast as they appear. The motives of agricultural editors, therefore, in commending to the patronage of their readers improved animals, implements of agriculture, &c., which *cost them money*, ought, like Cæsar's wife, not only to be beyond reproach, but *above suspicion*.—Hazardous indeed might it be to the fair credit of their commendations, were they ever to cause it to be conjectured, that their *own possession* of such animals or implements, and an over-veining anxiety to exchange them for the "thirty pieces of silver" in their neighbors' pockets could cause them to bestow encomiums where they are not merited. Hence, it is exceedingly questionable to our mind, whether, in these degenerate days of imaginary double-dealing and real loss of confidence, it would not be better for honest agricultural editors to *keep nothing for sale* upon which it is often their province to pass hyperbolic panegyrics.

For example, should any one of our honest contemporaries happen to assure his readers that the only true Berkshire hogs are *black*, with white feet, and a few white hairs on the tip "of the tail"—and should it subsequently appear to the satisfaction of his readers that the same honest editor had previously provided himself with Berkshires (so called) and thus "true in color," which he expected to *sell for high prices*, might it not by possibility cause some few shrewd old farmers to suspect they saw "a cat in that meal?" Or should any one of our honest contemporaries, in good faith, advise his readers that there are no genuine Durhams which are *red*, or that have any "black hairs" about their faces, and should it subsequently be found that the said honest contemporary had a herd of his own, no one of which would be rejected under such advice, might it not cause others again to suspect "a wheel within a wheel?"

We have much of the "milk of human kindness" within us, and "without money and without price" we make a free offering of these hints, for the general benefit of the "craft." For, upon the broad shoulders of the *craft*, the "periodical press of agriculture" is to be sustained; upon the periodical press, the facts, the science, and the real improvements of the age are to be impressed; and upon the dissemination of these, is the rapid advancement of the great interests of agriculture to depend for promotion. Now, when it is recollected that all this fine superstructure rests upon a no less solid foundation than the generous con-

fidence of the farmer in the credibility of the "craft," it is plain that were this honest confidence once rudely annihilated, the periodical press must eventually crumble with it, and in its wreck, an end would at once come to that healthful dissemination of facts, practical and scientific, and to that blessed transmission of substantial improvements which causes the highways of agriculture from the old to the new world to "blossom like a rose." Therefore, and we would impress it with respectful fervor, it surely becomes every honest conductor of the agricultural press to place himself upon the watch tower of a sober discretion, and with a telescope of no false lens, look around and about him, to see that not a shadow of a shade of doubt rests upon his strong fortress of disinterested truth. In plainer words, he should be vigilant at all times, and in all manner of forms, to *refrain from all speculation* to the amount of the value of a *pica-yune* in any of those choice or rare goods of agricultural economy, which it is his vocation to commend to the manifold uses and ends of the confiding tiller of the soil.

These things are said in due deference to the opinions and practices of others—in a spirit of good will to all, and of deep devotion to the true and permanent interests of our country's agriculture.

DOMESTIC CONVENIENCES—CISTERNS.

From the New Genesee Farmer.

Every farmer should give particular attention to convenience of his household department. Female labor may be lessened to a surprising degree by studying this part of domestic economy. To contribute our mite, we here briefly give an account of the construction of a rain-water cistern of our own.

The pit for the cistern was dug so that the outside of the cellar wall formed a part of one side. The wall was built of cobble stone in common lime mortar, one foot in thickness. The bottom, which was hard pan, was first covered with cobble stones, of uniform size, laid in water-lime mortar; a coat of the same mortar was laid upon this; and a second coat of smaller stones completed the bottom. The whole inside then received two coats of water-lime mortar. By applying these to the walls before they had become dry, and then drying very gradually, they were wholly free from cracks. After remaining a few weeks, protected by boards from the sun,—the upper edge of the wall was covered with a layer of water-lime mortar; two inch white oak planks covering the whole, (except a small curb, for the entrance of water and cleaning the cistern,) was laid on this mortar; a coat of water-lime mortar was then spread upon the plank; thick white oak slabs were laid again on this coat of mortar; another coat of mortar upon the slabs, and several inches of compact earth, forming with the planks and slabs, a little more than a foot in thickness, completed the covering. This is sufficient to prevent the water from freezing in the coldest weather, though the curb, (18 in. by 2 ft.) is left open. It also prevents all access of surface water.

The cistern adjoins the kitchen, and a lead pipe, one inch in diameter, passes from near the bottom, through the cellar wall, obliquely upwards, to the

kitchen floor, where it is attached to the lower end of a small pump. Thus, plenty of rain water is at all times at perfect command. The cistern is between 6 and 7 feet in diameter, about five feet deep, and holds about 40 barrels. Care should be taken to procure good water lime, failure often arising from bad material.—

BONE DUST FOR THE CULTIVATION OF GRAIN.

From the Repertory of Inventions.

The exportation of bones from Germany to England constitutes a singular epoch in the annals of commerce. Myriads of tons have been already exported without glutting the market, or causing a cessation of the demand. In the North Sea, mills have been erected to pulverize them. This bone powder or bone dust was long ago exclusively applied to the purposes of hot houses by German horticulturists; but the English, emboldened by their riches, have extended its use to general objects of agriculture, and fertilize, by these expensive means, their cold, humid, and poorest land; and have thus brought the uplands of Nottinghamshire, the western parts of Holderness, &c., into the highest state of cultivation, both in point of extent and intenseness of fertility. There is consequently, a proverb "that one ton of German bone dust saves the importation of ten tons of German corn." As Malta formerly covered her naked rocks with foreign soil, so does England now fertilize her clay and sandy heaths with German bones. Near the sea coast even the churchyards are robbed of their venerable relics, which is only ironically excused by rendering the German bone trade popular. An agriculturist, being rendered attentive by this vast exportation, instituted privately some comparative experiments, the results of which prove that bone dust acts in the cultivation of ground, as compared to the best stable manure, 1. In respect of the quality of corn, as seven to five. 2. In respect to quantity, as five to four. 3. In respect to the durability of the energy of soils, as three to two. It produces several collateral advantages: 1. It destroys weeds. 2. It diminishes the necessity of suffering the land to lie fallow. 3. This concentrated manure, or substitute for manure, is more easy of conveyance, less laborious to spread, and can with facility be applied to the steepest vineyards or other inaccessible lands, either mountainous countries or wet meadow land. 4. It renders agriculture practicable without cattle breeding, grazing, &c.

THE STATE AGRICULTURAL SOCIETY.

From the Carolina Planter.

Now that the all absorbing interest of our elections is over, and the excitement diminishing, will our friends think a little of our Agricultural Society.

Last winter we made a favorable commencement—the large delegation of planters and farmers to the convention seemed to promise better things for agriculture. The renewed attempt to establish a general society, to enlist the influence of gentlemen throughout our whole state, is wor-

thy of our most strenuous exertions to advance. Our people are so much in the habit of commencing every important matter on a grand scale, and then giving way, that it becomes us to look well to this matter, and impress upon our members the necessity of a continuance of their efforts.

In the fluctuating condition of the value of our staple products for several years—in the general adversity which prevails throughout our whole country—with our commerce embarrassed—our finance deranged—our crops short, and a necessity for rigid domestic economy, our policy certainly is to give greater attention to our produce which is consumable amongst us. With the extremely low price of our staples, we still have to furnish the same amount of meat, clothing, medical attendance, &c. to our negroes—our children's education has to be paid for, and the ordinary expenses of living have to be met—our taxes to the state are not reduced, and the calls of charity are increased, and what more valuable means can be adopted to aid us in our broken fortunes, than with unanimity and earnestness to put our shoulders to the wheel of domestic agriculture, and improve our condition at home. If we cannot produce as much saleable material as we desire to bring us in money, we can save a great portion of our expences by attending a little more to our immediate necessities.

Although many of our planters who have good lands, large forces of negroes, and are free from debt, can afford to make cotton at the low prices which have lately existed, still there is a numerous class who cannot compete with them, or with the planters of the fertile west. It is the interest of all this class to look more now to farming than to planting—to improving their lands, dividing their staples and giving their energies to the culture of the necessities of life. This class of planters, whose lands are worn, have either to dispose of their lands and negroes, or remove to other and more productive soils, or to be satisfied to use such means as are within their power to renew the capacity of their lands. It is becoming every year a question of importance whether our lands can compete with the west in producing cotton—and when the immense extent of country is considered which is yet to be brought into cultivation; and the necessity for laborers to work that soil, it is doubtful whether we can produce cotton at the prices which the steadily increasing products will necessarily induce.

The number of negroes in the southern states is limited—the lands extensive: in the south western states it is a well known fact that the increase is comparatively trifling—not at all to be compared with that in the southern and middle states. The tendency of the demand for slaves is towards the new lands of the south-west, and a continuance in the depressed price of our staples, will necessarily lead our planters to send them where the product is such as will enable profits to be made if that staple is alone to be depended upon.

When the present embarrassment of the country shall be relieved, and the difficulties of the south-western planters removed, there not being enough negroes in the country to cultivate one half of the western lands, their value will be enhanced. The loss from the climate and the small increase of that class of laborers in the west and south-west, will cause a constant demand for

them which will take them from our planters who are still planting worn out plantations in our state. It is said that in Virginia at this time there are but few to be had, and even with the present prices traders are taking them off to New Orleans.

The time is not distant when many of our planters of poor and exhausted soils will not be able to keep negroes at a price that western lands will fix upon them.

It becomes us all therefore to look to our main chance—the improvement of our agriculture—to give more of our attention and thoughts to our soils, to be able to keep what we have, and make our own means profitable. If men will consider the condition of the agriculture of the old countries, and look at the immense products of their staples compared with ours, and see the constant and persevering efforts of their agriculturists, it must certainly impress them with a belief that we can do something if we try.

The efforts making by the East India Company to improve the culture of cotton in the East Indies is worthy of our notice, although the probability is that our country can produce it always at as low a price as any other—still trammels may exist in the form of imposts that may prevent our competition with them at a future time. However under all circumstances it is our duty to exert ourselves in our own cause. We need an improved agriculture, and, with a proper effort we will have it.

THE TREATMENT OF SICK ANIMALS.

From the Farmer's Cabinet.

There are so many erroneous notions prevalent in the community respecting injured or diseased domestic animals, and such unnatural and injurious practices as a consequence of these incorrect views, that no apology is necessary for an attempt to subserve the cause and interests of these useful creatures, who, if they had tongues to speak, would tell sad tales of the wrongs to which they have been, and still are, too often subjected.

We do not propose to give an essay on the particular cases that require attention—our object is rather very briefly to ask the owners of domestic animals to be guided by a few correct principles, which are applicable to nearly all cases, and which will at least prevent our doing harm where we are not able to effect much good.

In the first place, then, we would insist, that when an animal is well he never requires any medicine—and when he is sick, we would protest against his being dosed with articles that are said to be good for a particular disease, without any reference to its violence or the symptoms, as common sense would dictate; that remedies the most opposite in their character and effects may be equally advantageous in different periods of a case.

Always distrust the man and the remedy, when your friend declares that an article is always 'good' or a 'certain cure' for a disease, without reference to its symptoms—prescribing for the name of the disease, rather than the disease itself; this is the very essence of quackery, in man or beast.

A large proportion of the diseases of animals

closely resemble those of the human family, require a treatment conducted upon the same general principles—with some variations and some peculiarities, it is true, but none of those outrageous departures from common sense which are too frequently witnessed.

A horse with pleurisy, or inflammation of the lungs, or apoplexy, requires a widely different treatment from one with colic or with worms. There is no more mystery about the diseases of a horse or an ox than about those of a man, and a violation of natural laws is as productive of pain and injury in one as the other.

There is, too, a great propensity every where to resort to active treatment in all cases—a feeling that is encouraged by the ignorant or designing for selfish purposes. An adviser in sickness is often most useful and shows most skill where he only tells what is to be avoided and waits for indications for more active measures—doing little more than preventing ignorant but well-meaning persons from interfering with salutary changes that may be going on.

Remember that there is a restorative power in nature, to which it is always better to trust, than to direct active remedies without knowing for what particular purpose they are given.

There is never occasion for the administration of the disgusting combinations which the poor animal is made to swallow, from the whim of an ignorant horse or cow doctor. Many a fine beast has been lost by his owner trusting to such prescriptions.

When your animal has fever, nature would dictate that all stimulating articles of diet or medicine should be avoided. Bleeding may be necessary to reduce the force of the circulation—purging to remove irritating substances from the bowels—moist, light and easily digested food, that his weakened digestion may not be oppressed—cool drinks, to allay thirst, and to some extent, compensate for diminished secretions—rest and quiet, to prevent undue excitement in his system, and so on through the whole catalogue of diseases—but nothing to be done without reason. Carry out this principle and you will probably do much good—hardly great harm;—go on any other, and your measures are more likely to be productive of injury than benefit. But, as we have before said, our object now is not to speak of diseases in detail—it is rather to encourage our agricultural friends to *think* before they *act*—to have a reason that will bear examination for every step in the management of a sick or injured animal—to remember they have a powerful assistant in nature, if she is fairly used—and that specifics, as they are called, are much fewer and less to be trusted than their proprietors would have us believe. We might, indeed, almost sum up what we would desire in one general direction of five words—TREAT YOUR BRUTES LIKE MEN.

RECEIPT FOR MAKING CIDER, AND PRESERVING IT SOUND FOR YEARS.

From the Raleigh Star of 1819.

Three months ago, I was at the house of Nicholas Nall, Esq., who lives near deep river, at the upper extremity of Moore county, where I drank

old cider of a very superior quality; and as the habitual use of cider is eminently conducive to health, insures sobriety, imparts the agreeable sensation of strength and vigor, and as it is a pleasant beverage that can be afforded at a small expense, I took care to be exactly informed of his manner of making, refining, and preserving it, in the hope that advantage might accrue in the publication of it. Mr. Nall had in his cellar, as well as I now remember, about 8 or 10 hogsheads, and fifty or sixty barrels, of cider, of different ages. The oldest was best; nor did he think any fit to drink until it was at least a year old. That which I drank was three years old, and it was excellent. His oldest cider I did not taste, as he intends it as a treat for his executors. He complained that his stock was too small to drink it of the age he wished, but intended to fill another cellar. I here copy Mr. Nall's receipt, as he gave it to me in writing in April last:—

"All apples fit to be eaten will make good cider. The grand secret is the cleansing it from the filth and dregs as early as possible. Each sort of apples are to be beaten and pressed by themselves. Two kinds of juice, both good, would, if mixed, often make bad cider. Throw out all imperfect, sorry, and sunburnt apples, as well as dust and trash. Beat your apples before much mellowed, as they lose their strength, soundness, and spirit, if too mellow. Let them stand half a day after being beaten, before put into the press, then press them slowly. Discontinue it as soon as the juice appears thin and watery. The advantage of slow pressure is in making the liquor run pure. Let your casks, previously well cleansed, be filled quite full, to permit the froth and pumace to discharge itself at the bung, when the fermentation abates, cover the bung closely with something that may be lifted by the fixed air that escapes during the future fermentation. In a week, rack off the cider carefully, ceasing the moment you observe it to run muddy. Now stop the cask more firmly. In ten days, rack it off a second time, and in fifteen days, a third time. In every instance, the casks are to be clean and perfectly well filled; and when filled for the last time, to be bunged close in a deep, dry cellar, never to be moved until drawn for use. Late cider need not be racked until March, and then one racking, or at most two, will be sufficient. Be very careful that no water, not even the little that will adhere after rinsing a cask, is mixed with the cider. The smallest quantity of rain water will render cider unfit to keep. The addition of any quantity of distilled spirits is not only useless but injurious."

Mr. Nall's method is the result of long experience, and its success justifies me in recommending it to the public. I hope it will be tried.

CALVIN JONES.

Raleigh, July 25, 1819.

REMARKS UPON THE FAILURES IN SILK-CULTURE OF THIS SEASON, AND ON THE THEORY OF G. B. SMITH.

To the Editor of the Farmers' Register.

Oct. 17th, 1840.

The editorial remarks in your August number, on the disastrous results attending the late rearings

of silk-worms during the past season, have attracted my attention. While the facts of the case are fairly and impartially stated, and while it must be admitted on all sides, that the cultivators of the silk-worm have been for the most part grievously disappointed, in their confident expectations of success, yet I consider it too soon to think of abandoning the enterprise. It would be counting too largely in a new and untried business, commenced under many disadvantages, and especially under the disadvantage of ignorance and inexperience, to suppose that entire or even general success was at first attainable. There may be, and no doubt is, a remedy for the evils which have befallen us. That remedy we should diligently strive to discover, instead of fainting by the way-side; and if each cultivator would contribute his mite of experience for the good of the whole, an amount of information might be acquired, sufficient to enlighten our path and direct our footsteps in the further prosecution of this important culture.

But amid so many disappointments, have we not in reality achieved a great deal? Has it not been proved that the silk-worm may be raised with eminent success early in the season, frequently as late as the first of July, and in some instances as late as August, and even September? All accounts represent the early rearings of the past season as highly satisfactory; even good results were in many cases attained in disregard of some of the first rules of good management. The adaptation of our climate to the prosperity of the silk-worm, at least until the first or middle of June, has been established beyond a doubt. To that extent therefore, it has been shown that our advantages for the prosecution of silk culture are at least equal to those of the old silk-growing countries of Europe. But we have not been content—nor is it to be expected that we should remain content—with the simple possession of these advantages. We have looked forward to the practicability of rearing successive crops from April to October; thus multiplying to the extent of five or ten fold the advantages of other countries. Unless something approaching to this can be accomplished, it must be conceded that the introduction of silk culture into this country will not become general. Whether the disastrous effects of the past season have been sufficient to destroy all reliance on successive crops, and to prove it to be the delusion of sanguine and enthusiastic minds, is the question which is to be candidly considered.

Various causes may have contributed to produce those effects, which further experience may enable us to obviate, either wholly or in part. You have stated several of those causes with your accustomed impartiality. The wetness of the season, the reliance on eggs produced by a diseased stock, the unfitness of buildings, (for there are comparatively few regular cocooneries,) the succulent, watery quality of the food, and the bad management of cultivators, most of whom were totally inexperienced, were sufficient causes to prevent uniform success. Indeed, distinguished or general success under such an adverse state of things, might rather have been regarded as wonderful, than that failure should be considered discouraging and disheartening. To the causes already assigned, I will add another, which I be-

lieve to be still more potent, namely, the very inefficient manner in which the eggs of the silk-worm were preserved and retarded for late rearings, thereby rendering worthless a stock originally good. It is obvious that the process of retarding should be commenced early in the winter, before the accession of warm or moderate weather has had any influence on the condition of the embryo. The object is to prolong the winter through which the eggs have to pass previous to hatching; in other words, to continue them in precisely the same state in which they exist at the beginning of cold weather. If they are suffered to be exposed for a few weeks, or even a few days, to mild weather, such as almost uniformly occurs in February, some degree of change must necessarily take place in the condition of the eggs; and if their progress towards the hatching state be suddenly arrested, the effect must inevitably be injurious. They should also be preserved in an equable temperature, as nearly at 40 degrees as possible. The fluctuations of temperature are greater even in an ice-house, at the surface of the ice, than one might suppose without having verified it by an instrument. The atmosphere of a box, resting immediately on the ice, will vary according to the state of the weather from 45 to 55 degrees. Imbedded in the ice, it will range from 37 to 45 degrees. But it is not alone by subjecting silk-worms' eggs to a low temperature, that they will be preserved uncorrupted. If the air be foul, either from decaying wood or other vegetable matter, or from a want of circulation, the good quality of the eggs will suffer deterioration. It is therefore necessary that some substance be used to correct the gaseous impurities that may be generated; and the simplest and most efficacious agent for this purpose is charcoal. A quantity of it well pulverized, should be placed in the boxes or vessels containing the eggs. In addition to all this, the eggs must be kept dry. When taken out for hatching, they should be gradually exposed to the external air; and the contents of the box should seldom or never be subjected to the influence of the warm air, even for a moment, until they are taken out to be hatched.

I respectfully submit whether these conditions for preserving and protracting the hatching of eggs are not rational? And if they are, what a fruitful source of disease and disaster has arisen from disregarding them. They have probably not been complied with in one case out of ten. I feel warranted therefore in repeating that the neglect or omission to take proper care of the eggs, is perhaps one of the most potent causes of the evils to which the silk culturist has been subjected.

But notwithstanding every precaution in preserving the eggs, it is still very possible, not to say probable, that the hatching may be protracted so far beyond the natural time as to render them unfit for the production of a healthy progeny. No process of retarding has been devised by which the tendency to hatch has been entirely arrested or suspended. Some advancement towards the hatching condition, however gradual, will be made even at the lowest temperature to which eggs can be conveniently subjected, when they are kept much beyond the natural period for them to hatch. There is great reason to believe that a want of due attention to this fact may be added to the other causes of failure; and that before perfect success

in the rearing of successive crops can be attained—if attainable at all—the cultivators of the silk-worm must provide themselves with a stock of eggs saved at successive periods during the season. This view of the subject has been strongly presented by Gideon B. Smith, who has founded upon it what may be termed a new theory, which he has recently promulgated and endeavored to establish. The basis of his theory is the fact that the eggs of the silk-worm *naturally* hatch at the expiration of one year from the hatching of the preceding generation; and the deduction is that the farther the hatching is removed by artificial means beyond the natural time, the more liable is the progeny to degeneracy and disease. To what extent the hatching may be safely postponed, cannot at present be determined with precision. Mr. Smith adduces facts to show that it may be extended one month beyond the natural time, without impairing the good quality of the eggs; and by exercising judicious care in the preservation of the eggs, the period may be still further postponed.

Since the publication of this theory, I have endeavored to test its claims to acceptance by reviewing the facts which have come under my observation during the two past seasons; and I feel bound to state that it offers a solution for many difficulties which were before inexplicable to my apprehension. It is, moreover, a *rational* theory, and in harmony with the laws of nature. It commends itself therefore to the serious attention of those who intend to persevere in silk culture in spite of the disasters of the present year—disasters which it may be reasonably hoped are only temporary, and capable of being obviated by the use of such precautions as the subject merits and requires. Further experience may lead to some modification of the details without invalidating the principle.

You have contrasted the results of the past and present years in rearing silk-worms, but have not attempted to account for the difference. May not Mr. Smith's theory explain the mystery most satisfactorily? In the year 1839 all our late rearings were from northern eggs. The season was not less wet and unfavorable in every respect than that of 1840. Now it is well known that during the continuance of the mulcaulis mania, the experimenters with silk-worms could not obtain foliage earlier than June or July. The sole reliance was on the leaves of young trees raised from buds planted the preceding spring, and from roots transplanted. All the eggs therefore which were received from the north must have been derived from worms hatched not earlier than the fore part of June—in many cases from even later broods. Such eggs, if of good quality, should, according to Mr. Smith's system, have produced healthy worms if hatched within thirteen months from the hatching of the parent generation. The late rearings in Virginia last year were attended with results which gave general satisfaction and encouragement. It is but fair therefore to presume that those results were modified by the principle on which Mr. Smith's theory is founded. And in all instances where I have been able to learn the facts and dates, the late rearings of this year, derived from the late rearings of last year, have been attended with much better success than those derived from spring-laid eggs, long retarded. But in the general ignorance of the principle adverted

to, there was no regularity observed in hatching eggs, according to their dates. On the contrary, the early saved eggs, being generally considered the best, were reserved for summer use; and the summer laid eggs were hatched before the natural time. To this cause, as well as to the imperfect manner in which the eggs were generally preserved, may be reasonably ascribed much of the failure and disaster of the present year.

It has been objected on high authority to the theory of Mr. Smith, that if it be true, its effect will be to prostrate the silk business entirely. But why should it produce this effect? All the inconvenience that can possibly ensue, even if the principle was fully admitted and acted upon, would be the trouble of saving the eggs at several times instead of at one time. How it can be fatal, or even detrimental to the interests of silk culture, it is difficult to conceive. If there be any facts going to invalidate it, let them be adduced. No theory can stand in opposition to them.

It becomes the friends of silk culture to prosecute their labors next year with increased caution and attention. After the experience of this year, it will perhaps be advisable to attempt full crops of silk-worms in the early part of the season. There can be no doubt that with tolerable care, all the spring broods will be healthy, and the results successful. Late rearings, however, should not be neglected. It is exceedingly desirable to ascertain how far the character of the past season has been unfavorable to the welfare of the silk-worm; to what extent eggs preserved in the best manner may be safely retarded; and how far further experience may confirm or overthrow the system of Mr. Smith. In the course of another year, or a year or two at most, we may acquire the true art of raising successive crops with certainty and success—a consummation which doubtless is attainable; and which, if attainable, the sagacity and perseverance of our countrymen cannot fail to realize.

A FRIEND TO SILK CULTURE.

COWS HOLDING UP THEIR MILK.

From the New England Farmer.

Mr. Editor—Sir: I am not in the habit of writing for any publication, but as I have just commenced farming with my father, who is one of the best managers of the old school, I feel very much interested in whatever I see or hear relative to the management of a farm. I thought I might be of use to some one by giving my father's mode of treating a cow that holds up her milk on taking away the calf, or at any other time. In the first place he ascertains what kind of food the cow likes best; whether it be meal, oats or potatoes:—he takes the food and coaxes her to one corner of the yard or into the stable; gives it, and begins to milk:—if the cow refuses to give her milk, he tries the same the second time, and has always succeeded to get the milk as freely as from any other cow unless the food was neglected, or contained something which she did not like. My father bought a young cow last winter: she had her calf quite early in the spring: on taking away the calf she held her milk, giving it down only once in two or three days: he tried several experiments, (not lik-

ing the trouble of feeding,) till the cow was nearly dry: finding none of them effectual, he began to feed, and never has been troubled since. The cow says, no supper no milk. This is the fourth or fifth cow of this description he has had, and has always succeeded in getting the milk as freely as from any other cow. J. C.

SIBERIAN DOGS.

From the Foreign Quarterly Review.

The best friend of man in almost every clime is the dog, but in Northern Siberia existence would scarcely be possible without the aid of this invaluable animal. All along the Arctic Ocean the dog is almost the only beast of burden. He is harnessed to the light sledge, or *narte*, which will carry no inconsiderable load, and in which, during winter, the natives perform journeys of incredible length. The Siberian dog bears a strong resemblance to the wolf. He has a long pointed snout, sharp upright ears, and a long bushy tail. Some of them have short hair, others a tolerably thick fur, and they are met with of all imaginable colors. Their size also differs very much, but a dog is not thought fit for the sledge if less than one arshin and two vershok high, and one arshin and five vershok long.* Their barking resembles the howling of a wolf. They always remain in the open air. In summer they dig holes in the frozen earth to cool themselves, and sometimes they will spend the whole day in the water to escape from the persecution of the gnats. Against the intense cold of winter they seek shelter by burying themselves under the snow, where they lie rolled up with the snout covered by the bushy tail. Of the cubs, the males only are usually kept, the females are mostly drowned, only one or two being entertained by each father of a family to preserve the breed. The rearing of these dogs forms an important occupation, and requires no little skill and judgment. A dog may be put to the sledge when a year old, but cannot be subjected to hard work before his third winter. The team of a sledge seldom consists of less than twelve of these dogs, of whom one is used as leader, upon whose breeding and docility the safety of the whole party depends. No dog must be used as a leader unless he be perfectly obedient to the voice of his master, nor unless the latter be certain that the animal will not be diverted one moment from his course by the scent of any kind of game. This last point is one of the highest importance, and if the dog has not been well broken in, but turns to the right or left, the rest of the dogs will immediately join in the pursuit, when the sledge is of course overturned, and the whole pack continue the chase until some natural obstacle intervenes to arrest their course. A well taught leader, on the other hand, not only will not allow himself to be seduced from his duty, but will often display the most astonishing tact in preventing the rest of the team from yielding to their natural instinct. On the boundless tundra, during a dark night, while the surrounding atmosphere is obscured by the falling snow, it is to the intelligence of his leading dog that the traveller is constantly indebted for his preservation. If the animal has once been the

* Three Russian arshins make seven English feet, and each arshin is divided into sixteen vershok.

same road before, he never fails to discover the customary halting-place, though the hut may have been completely buried under the drifting snow. Suddenly the dog will remain motionless upon the trackless and unbroken surface, and by the friendly wagging of his tail announce to his master that he need only fall to work with his snow-shovel to find the door of the hut that offers him a warm lodging for the night. The snow-shovel on these winter excursions appears to be an appendage without which no traveller ventures upon a journey.

In summer the dog is no less serviceable than in winter. As in the one season he is yoked to the sledge, so in the other he is employed to draw the canoe up against the stream, and here they display their sagacity in an equally surprising manner. At a word they halt, or where an opposing rock bars their progress on the one side, they will plunge into the water, swim across the river, and resume their course along the opposite bank. In short, the dog is as indispensable to the Siberian settler, as the tame reindeer to the Laplander. The mutual attachment between the Siberian and his dog is in proportion to their mutual dependence on each other. M. von Wrangel relates remarkable instances of the extent to which he has seen some of the people carry their fondness for their dogs. In 1821 an epidemic disease broke out among the dogs in Siberia, and carried off many thousands of them. [Hessays] "A Yukaheer family had lost the whole of the twenty dogs of which they had recently been possessed, and two newly-born cubs were all that remained. As these animals were still blind, and without a mother's care, it scarcely appeared possible to preserve them. The Yukaheer's wife, to save the last remnant of the wealth of her house, resolved that the two dogs should share the milk of her breast with her own child. She was rewarded. The two adopted sucklings thrived wonderfully, and became the ancestors of a new and vigorous race of dogs."

The sufferings of the poor inhabitants, in consequence of the loss of the dogs, through the epidemic malady that raged in 1821 and 1822, were dreadful in the extreme. Yet will it be believed, that an order was once actually issued by the government at St. Petersburg, to destroy all the dogs throughout the north of Siberia, "on account of their consuming such quantities of provisions, and thereby occasioning such frequent famines." The order was not executed, because it would have required the whole Russian army to enforce the command, and after a while means were found to enlighten the rulers upon the absurd tyranny of their proposed "reform."

CULTIVATION OF DACTYLIS GLOMERATA, OR ORCHARD GRASS.

From the New Genesee Farmer.

Messrs. Editors.—*Gentlemen*—In answer to the inquiries of Sereneus, in his interrogatories through the medium of your journal, I beg leave to remark that I have been in the habit of cultivating the orchard grass, both for seed and hay, for the last 25 years, and am of the full conviction that it stands as high for hay or feed as any other. As

to the soil best adapted to its growth, I conceive that moist rich loam is the best; but I have found that when I have sown it among other grasses for pasture, it grows luxuriantly; and in cases of severe drought, when all other grasses are apparently dead, this stands the best, being all the time green and fresh. The best time for sowing the seed, I conceive to be about the middle of July or first of August, as probably nature directs this the best time for sowing, when seed comes to maturity, which is about that time, or earlier—to be dragged in on mellow land,—yet I have always stocked in the spring with oats, at the rate of a bushel to the acre, and if the oats are not too heavy it generally grows well. Its value for hay, I think, stands as high as any other grass, and for seed and the second crop it stands pre-eminent, as it comes forward earlier in the spring and holds out longer in the fall. On my farm in Connecticut, from whence I removed this spring, I usually cut from two and a half to three tons per acre, exclusive of the seed which I reaped before mowing in the same manner as I would wheat, and generally secured from 15 to 20 bushels of seed to the acre. The second crop yields from one and a half to two tons per acre.

I know not how this grass will grow in this country, but I doubt not that the soil here is admirably adapted to its growth, as the land is rich, and in my opinion will grow well almost every kind of grass that the farmer may wish to cultivate. I brought with me a small lot of seed, and stocked last spring with oats about an acre of land; and the result is I have a fine piece of orchard grass, which is coming forward to my entire satisfaction. I intend to save seed enough next year to stock more, and furnish my neighbors some should they wish. In conclusion, I would advise "Sereneus" to try this kind of grass, and presume he will find it for his interest to grow it for both pasture and hay.

ZEPHARIAH CONE.

Batavia, September, 1840.

ON RAISING AND CLEANING CLOVER SEED—CLOVER MACHINES.

From the New Genesee Farmer.

Messrs. Editors—In your last paper you acknowledged the receipt of my communication on the subject of thrashing and cleaning clover seed; and you also required more minute details on the subject. I willingly give you my experience and observation. I will treat the subject systematically, and take each query proposed by you in order.

1st. *As to the kind of soil.*—As far as I have been able to judge, a sandy, or loamy, or in fact, any light soil is best adapted. It seldom does well on clay soils.

2d. *As to the time and frequency of sowing.*—We generally sow in the first opening of spring, while the ground is moist and open; in order to give the seed a chance to penetrate a little into the ground. There are many farmers who sow as early as the beginning of March; and some sow when there is a little snow on the ground, to enable them (they say) to sow more accurately. Clover intended for seed, ought never to lay more than two years, because, after this, much of it will

run out, and make room for various kinds of grass and noxious weeds.

3J. *As to the time of cutting.*—On this point I entirely coincide with your valuable correspondent, Mr. Harmon, that the seed should be perfectly ripe. 1st, because it will yield more seed per acre when sold by weight; and 2J, because it will thrash at least one third easier.

4th. *Is the first or second crop best?*—Experience teaches us that the second crop will yield generally about one third more; the reason we suppose to be, that the first crop, ripening in the heat of summer, ripens too speedily, and consequently the seed is very much shrunk, and of course a very bad sample.

5th. *Amount of seed obtained from an acre.*—We generally expect, on suitable soil, from two to four bushels; but this depends much on the season; a wet season being by far the most productive. We seldom cut more than a bushel per acre on stiff clay soils.

6th. *Whether the thrashing cannot be done by a thrashing machine instead of a flail?* I have seen this tried several times. 1st, with a spiked machine. We found that it took as long to separate the heads from the straw—the latter being mostly broken up—as it did to thrash it with a flail; and also, that after doing the best we could with it, there remained nearly double the bulk of chaff, and broken straw mixed, to be thrashed with the clover machine, allowing for the services of the machine two extra men and four horses. It was next tried with what we call a better machine. We found this the best in one point; the straw was somewhat broken up; but, as an offset against this, we found it impossible to make it thrash clean.—We therefore concluded that the flail was by far the best.

7th. *What is the cost of a clover machine with and without the horse power?*—To this I must observe that I have seen the kind mentioned by your friend Harmon, and those made by Mr. Burrall of Geneva; but I consider the kind briefly mentioned by me in your last paper, not only the most convenient for a stationary machine, but likewise the cheapest: a friend of mine having made several of them (without horse power) for \$40, materials inclusive.

8th. *Can the clover machine be easily adapted to the different horse powers used in thrashing wheat; and what amount of power is required?*—This query may be speedily answered by the fact that I never knew a farmer who had a separate horse power for his clover machine. The generality of clover machines can be worked with three horses, but four are best.

There is another point which you forgot, and I had nearly forgotten to mention. It is the quantity of seed necessary to sow an acre. We usually sow a bushel on six acres, but some farmers consider a bushel to ten acres to be sufficient.

Remarks.—The plan usually pursued in this country for raising clover is this: We seed our wheat at the time above mentioned. After harvest we are careful that nothing feeds on this clover for the remainder of the season, for it injures the young clover very much. The next season we cut a crop of hay, say about the middle of July; then sow on about two bushels of plaster, and let it grow for seed. We repeat this the

second season, and the ensuing spring we plough up for fallow.

Yours, &c.,
W. N. H.

Yates Co., Sept. 1840.

OF THE COURSES OF CROPS.

From Arthur Young's Travels.

PIEDMONT.—*Chentale.*—A year of fallow common in five or six years, during which year the land is never watered, only exposed to the sun. Wheat is sown on fallow; on clover land; always after hemp, because the land is in high order; the same after maize, if well manured; in which case also after millet sown in June, otherwise meslin or rye. The fallow for wheat, commonly follows buckwheat, called here *fromentin*, or millet. Clover is sown among rye in March, never among wheat. Millet de cottura is sown in June; millet de restuba the end of July, after wheat; and then dung well for hemp.

Turin.—In some arable land I viewed, a few miles from this capital, the following most extraordinary course was pursued, and was mentioned to me as being not uncommon; 1 maize; 2, wheat; 3, wheat; 4, wheat; 5, maize; 6, wheat; 7, wheat; 8, wheat.

The year of maize being considered as such a preparation, as to allow of three successive crops of wheat. The practice however is barbarous. Upon the farm of Sig. Briolo, the following is the course;—1, maize; 2, wheat; 3, rye; and when the land wants repose, clover is sown upon a small part.

Vercelli.—Upon good wheat land;—1, maize; 2, wheat; 3, wheat; 4, rye. And in the rice grounds;—1, fallow; 2, rice; 3, rice; 4, rice. They have here an excellent practice, and it extends, more or less, over all Piedmont, which is to mow clover by the 10th of May, and to plough the land and plant maize, which succeeds greatly after clover.

MILANESK.—*Milan.*—The arable lands never repose; but a quick succession is reaped. Two crops of bread corn are gained in one year, by sowing maize in July, after wheat.

Milan to Pavia.—The course common in the rice grounds, is,—1, rice; 2, rice; 3, rice; 4, fallow, and dung; 5, wheat, clover sown, either with it in autumn, or upon it in spring; the former best; 6 clover; 7, clover; 8, clover; 9, flax, and then millet the same year: and then rice again, as above.

Also,—1, wheat; 2, clover; 3, clover; 4, clover; 5, clover; 6, flax and then maize; 7, wheat, and clover again. Sometimes after flax, coleseed for oil. Another course,—1, 2, 3, clover; 4, maize; 5, rice; 6, rice; 7, rice; 8, fallow; 9, corn, and clover.

In the Pavese.—1, rye, and then fallowed for, 2, wheat, sown with clover in February, mown with the stubble, and then fed; 3, clover, 4, clover; 5, clover; 6, flax, and then millet; or, instead of both, maize; 7, wheat; 8, wheat, and left, then, sometimes, to pasturage under clover.

Mozzata.—A course common here,—1 clover; 2, winter flax; 3, lupines; 4, maize, for forage; 5, coleseed; 6, cabbages; 7, panic; 8, hemp; 9, beans. This course will be found to occupy about

twelve pertiche in one hundred, and to pass in succession over the whole, for the benefit of variation. Another,—1, wheat, and millet after; 2, common maize; 3, wheat and millet; 4 common maize; 5, rye and quarantino; 6 common maize; 7 rye and quarantino; 8 common maize. The assiduity with which they avoid a fallow deserves attention; and it is here effected, as in the south of France, by means of a plant that is asserted by many to exhaust.

Lodizan.—1, Wheat, sown in October and reaped in June, and the land ploughed thrice, and manured for, 2, wheat again, and clover, called *spianata agostano*, which is led till the following spring, but sometimes ploughed the end of autumn; 3, flax; 4, millet. Another course, called *coltura maggenga*.—1, break up the layer for flax; 2, millet; 3, maize; 4, wheat, the stubble of which remains in *spianata agostano*.

Cremonese.—1, Wheat sown in October, and reaped in June, the stubble ploughed thrice for, 2, wheat, upon which sow clover the end of February; 3, clover, ploughed in November for, 4, flax, and then millet; 5, maize; 6, wheat.

Carpianese.—1, Maize; 2, wheat sown in the spring with clover, which is mown with the stubble, and remains *spianata agostano*: 3, clover; 4, flax, and then millet; 5, rice; 6, rice; 7, rice.

VENETIAN STATE.—**Bergamo.**—The land here is constantly cropped;—1, wheat; 2, clover, mown in the spring once, in time for maize; 3, wheat; 4, clover. Also,—1, clover or millet; 2, maize; 3, wheat. By which courses they have half or a third of their land in wheat every year.

Brescia.—1, Wheat and 20 lb. of clover-seed in March, per jugero,—the clover cut in August with the wheat-stubble, and then pastured; in winter dunged;—2, clover called this year *prato grasso*, cut thrice; first in May, called *il maggiatico* second in August, called *l'ostano*; third in September, *il navarolo*:—3, in March sow flax, which is gathered in June; then plough and sow quarantino, amongst which, at the second hoeing, sow lupines for manure:—4, plough in the lupines and sow wheat in November, which is reaped in June; cut the stubble immediately, and sow lupines or coleseed for manure:—5, plough in October, and sow wheat mixed with rye; reaped in June, and then sow part with quarantino and part with panic:—6, if a crop of coleseed is taken, it is sown amongst the maize while growing, which cole is ripe in spring, in time to clear the ground for manuring and sowing the common maize; if cole not sown, remains fallow in winter and sow *melica* in spring,—the great millet.

Verona.—Here, as in all other parts of Lombardy, the land is never fallowed;—1, maize, called *grano turco*:—2, wheat, and, when reaped, millet, or *cinqantino*; this is the quarantino of the Milanese:—3, barley or oats, and, when reaped, some other second crop. Wheat is always sown after maize, and that after barley or oats. No clover used here, except in rice-lands. In the rice-grounds,—1, wheat reaped time enough for a crop of *cinqantino*; 2, maize; 3, clover; 4, rice, &c. &c. Beans are also sown instead of maize, and wheat after them, and prepare for wheat much better. On the dry lands, such as about the Lago di Garda, &c. no clover, as the land is not good enough.

To Vicenza.—No fallow any where. There

is a little clover, and very fine, but the quantity is small: all wheat and maize, and scarcely any thing else.

Vicenza.—Wheat is always sown after clover, and *cinqantino* after wheat; but nothing prepares so well for that crop as beans, so that they are called the mother of wheat, *madre della formento*. This idea, in Lombardy, is as old as Gallo, who remarks, that wheat succeeds after nothing better than beans, which in *grassano maggiormente la terra, che non fa ogni altro legume**; and this he refers to as a custom of the Cremonese and the Mantuans. It is equally true in England; and such a combination of authority ought to convince such as yet want conviction, of the utility of beans as a preparation for wheat; more, perhaps, to be depended on than any other preparation whatever. A common course near this city, introduced as a variety, is,—1, maize; 2, wheat and *cinqantino*. A farmer cultivated a field, during some years, in this course,—1, maize; 2, wheat; 3, clover: and to preclude the necessity of dung, he used only the *vanga* (spade): for five years his crops were good, but afterwards declined greatly, till he could not get even clover. They sow wheat in October, and the clover-seed over it in March, if there is rain; the end of June the wheat is cut; the end of August the clover is mown for hay; and another small crop again in October: here is, therefore, within a year, one crop of wheat and two of clover. The grass is cut again in May, or beginning of the following June; a second time in August; and a third growth ploughed in for wheat, which is usually a very great crop in this husbandry.

Padua.—On all sorts of land, the most usual husbandry is,—1, dung for maize; 2, wheat; 3, wheat, and then *cinqantino* or millet, &c. Clover is sown both in autumn and in spring; if the frost is not very severe, autumn is best, but spring the most secure. It is cut once after the wheat is reaped.

Venice.—Sig. Ardaino assures me, there is no fallow to be found in any part of the Venetian territory; they have not even a word to express the idea—*l'anno di riposo*, is a different thing, and always means clover, or a state of rest, without any tillage. That gentleman's expression pleased me much,—*La jachere è una sciocca pratica in agricoltura*. The two great points on which the best agriculture of the Venetian state turns are maize on clover, and wheat on beans. All these plants are equally necessary upon a farm; and there is a peculiarity in clover, as a preparation for maize, and equally in beans, as preparatory for wheat.

Bologna.—In a very rich field near this city, which I viewed, the course has been, in 1787, wheat, which produced 100 corbi, or twenty times the seed. In 1788, hemp 5000 lb. In 1789, it is now wheat, and perfectly clean. This course, of—1, hemp; 2, wheat, is perhaps the most profitable in the world,—and brings to mind the noble vale of the Garonne, under the same management. If land will do for hemp, they never fallow, but have some fields in the course,—1, fallow; 2, wheat, which ought to be considered as a disgrace to Lombardy. 1, Maize; 2, wheat, is

* Le Venti Giornate dell'Agricoltura. Brescia, 1775. 4to p. 59.

a course not uncommon. On the fallowed lands they sow beans, provided they have dung. Very little clover, preferring fenugreek, which is succeeded by wheat. Vetches they sow in autumn, and beans also, both for a crop, and also to plough in, in the spring, as a manure for hemp. With equal quantities of manure, beans give better wheat than hemp. Beans on Sig. Bignami's farm, are now (November) six inches high on the tops of narrow ridges, but none in the furrows; these are for a crop, and infinitely too thick, I should apprehend. Lupines also, for ploughing in.

TUSCANY.—In the Valdarno di Sura, Colini, Sienesi, Fiesani, Volterrana, they fallow, and their course is,—1, fallow; 2, wheat. After travelling so long in Lombardy without a fallow, it hurt me to find them common here. Clover is usually made a preparation for maize in most parts of this country; and beans, where sown, are reckoned the best for wheat. At Martelli, &c. the course is,—1, beans, French beans, or maize; 2, wheat; 3, wheat; 4, wheat and rye, and no after-crop. In the Valdichiana, the following course, I am informed, is pursued,—1, maize and French beans; 2, wheat, and nothing after it; 3, wheat and then raves,—and, in some places, clover added. At Villamagna, the course is,—1, *biade*, vetches, beans, &c.; 2, wheat; 3, wheat; 4, wheat. The first wheat produces nine or ten times the seed, if after beans; the second six or seven; the third three or four:—a degradation that ought to explain fully the absurdity of such a system. In some districts the following is the course,—first year, *biadi*, viz. beans, pease, chick-pease, French beans, tares, lentils, oats, maize, the great millet, small millet, panic in part, clover and oats, and after cutting for forage, plough for some of the above. Second year, upon the land thus prepared, wheat is sown, called *grosso* and *aristata* mucked; or with half *grosso* and half *gentili* (white wheat). Third year, *gentili* wheat.

MODENA.—The bad farmers in the Medenes are fallowists, and their course is,—1, fallow, ploughed first in May or June, in August the second time, and the third in October, for sowing, 2, wheat. But the better farms substitute beans, French beans, vetches, spelt, maize, particularly the last instead of a fallow. Upon soils that are very good, and manured, they have an execrable custom of taking three crops of wheat in succession; sometimes throwing in clover with the wheat, which is ploughed up in June for wheat again. When beans are sown in autumn, and stand the frost, they yield much more than spring sown.

The husbandry practised by Sig. Bertolini, which is the best of the country, is,—1, beans, sown in October, and harvested in May: then French beans, or formentoni, for forage, or chick-pease, or lentils; 2, wheat, the stubble ploughed thrice for, 3, wheat; 4, maize, sown in March. To Reggio they fallow some of their land every third year; but more commonly substitute maize, beans, or something else in lieu.

PARMA.—In the country about Vicomero, the common course is,—1, beans; 2, wheat; 3, maize; 4, wheat.

PIEDMONT.—*Tortonese.*—A common course here, is,—1, beans; 2, wheat. Also,—1, meliga, (great millet); 2, wheat. But they have some lands in fallow courses.

SAVOY.—At Lanesbourg, the common husbandry is that of a crop and a fallow: they plough in May or June, and again for the seed in August, when they sow the rye; and they have no wheat.

From these notes it appears, that there is something both to commend and to condemn in these Italian courses. The rejection of fallows is pretty general; this is a good feature, and the great stress they lay on beans, as a preparation for wheat, cannot be praised too much. On the other hand, there seems to be no idea of so proportioning the crops of a farm, as to make cattle and sheep (kept on arable land) the preparation for corn: the culture of clover is not unknown, but scarcely extends further than to produce some hay. I no where met with artificial grasses introduced on so large a scale as to support a good flock of sheep. In some districts, the great plenty of watered meadow explains this deficiency; but there are more where it will not afford an apology. This objection, however, does not hold good in the Lodizan, where their immense dairies are supported on arable land, and certainly form one of the most curious systems of husbandry that are to be met with in Europe.

AN EFFECTUAL MODE OF FRIGHTENING CROWS FROM CORN-FIELDS.

For the Farmers' Register.

During my residence in the western part of Louisiana, which is much infested by black birds and crows, I frequently observed a white cotton thread suspended from the top of one cane (or large reed) to the top of others throughout the length of their corn-fields. I inquired the use of it, and was answered that it scared the crows or black birds, I do not recollect which, but am of opinion it scared both. Since my return to Virginia, I have settled on a small farm in Chesterfield county. Three sides of my field are enclosed by pine woods, the most choice abode of crows. Immediately after planting my corn, I tried the experiment. I procured small pine poles, 15 or 16 feet in length; set them in my corn-field, 50 or 60 yards apart lengthwise the field as it was long and narrow; then stretched the cotton twine from the top of one pole to the top of another, throughout the field; and found that my corn was protected from 40 to 50 yards on each side of the twine so suspended. The next season my field being in form an obtuse angled triangle, and would require a number of threads stretched parallel through the field on account of its form, and by way of saving labor and thread, as well as for experiment, I stretched the thread around the field, or set the poles on the outer edge of the corn-field, say about ten or fifteen yards from the fence, which protected the corn entirely from crows. The present year I enclosed or stretched the thread around thirty acres of corn, say with two pounds of cotton twine, at 31½ cents per pound, and am well satisfied that I did not lose one hill of corn by crows.

It is my positive belief that if a field of any magnitude was enclosed by the thread (unless a crow on entering the field should fly so high as not to observe the thread,) there never would be

one in it, as long as the thread was suspended. I get small saplings, as small as I can, (so that they may give way to the winds,) about 15 to 16 feet long. First drop them around the field at 50 or 60 yards' distance; then I make holes with a "stab," (or pointed stake,) so as to set the poles firm in the ground. Then I wrap the thread around the end of the first pole and set it up firm; go on to the next with my ball of twine, wrap it around that, and so on throughout; observing to stretch the thread as tight as possible, in the first instance, as it will swag very much after a rain or heavy dews. I give these directions because I believe, from experience, that it is necessary that the thread should swag a little, so as to be kept in motion by every slight breeze. I hope that many will try it.

JAMES LYNCH.

REMARKS ON DIFFERENT BREEDS OF HOGS.

To the Editor of the Farmers' Register.

Of all the improved breeds of hogs introduced into this state, the Essex half-black pig, of England, or as it is called here, the Skinner breed, and the Berkshire, are the finest I have seen. The former were, I believe first introduced by means of an English farmer of reputation, who had been present at various cattle shows in this country, and on his return to England in 1825, sent a pair of them, as better than any he had seen here, to John S. Skinner, esq., then as now, editor of the American Farmer, at Baltimore. It does not appear that he gave the name by which they were known in England. But from a drawing of the sow, on page 372 of the 6th volume of the American Farmer compared with drawings of the Essex half-black pig, in Dickson's Farmers' Companion, vol. ii., p. 898, and Mr. Western's sow, p. 286 of the Complete Grazier, edition of 1830, the identity of the two breeds seems to be established beyond a doubt. "The Essex half-black pigs," says the Complete Grazier, p. 286, "are apparently descended from the Berkshire stock, and may be reckoned among the finest breeds in this country, [England.] They are black and white, short-haired, fine skinned, smaller heads and ears than the Berkshire, but the latter are feathered with inside hair, which is a distinctive mark of both; short snubby noses, very fine bone, broad and deep in the belly, full in the hind quarters, but light in the bone and offal. Mr. Western describes them as feeding remarkably quick, growing fast, and of an excellent quality of meat, and he considers them at least equal, upon a fair comparison of age, food and weight, to any sort whatever."

This is an excellent cross upon other breeds, and though the Complete Grazier is high authority, and I feel that it savors of presumption to question its accuracy as to the fact that the Essex half-black is descended from the Berkshire, yet an inexperienced eye, comparing the drawings of the two, in that work, with the Berkshires we have now, would inevitably conclude that the latter are descendants of the former, as they show all their best points, in most of which fine points the Berkshires of 1807 appear to have been deficient.

The Berkshires are certainly very fine hogs, longer and larger than the Essex half-blacks, but

they may not do as well under the customary Virginia mode of raising and treating this valuable animal. If they will, they are certainly to be preferred, generally; and as the demand for them appears to be increasing in our state, it is important to us to know which are the true "Simon Pures," especially as differences of opinion exist in New York, whence our supplies are derived.

In the 'Complete Grazier,' p. 286, will be found a drawing of a pair of Berkshires "exhibited at Lord Somerville's cattle show in 1807, when they attracted universal admiration." Now, the Berkshires of the present day (those at least that I have seen) resemble this pair, as to form, about as nearly as a mule resembles a horse—the advantage being greatly in favor of the modern stock. In the article which accompanies the plate, it is stated that one of the specific characters of the Berkshires in 1807 was a "reddish color with brown or black spots." In Dickson's 'Farmers' Companion,' vol. ii., p. 897, they are described as "Tawny or reddish color, spotted with black; large ears, hanging over the eyes; thick, close and well made in the body; legs short; small in the bone: disposition to fatten quickly." Low, in his Practical Agriculture, which is probably the latest authority, says, "The Berkshire was the earliest of the improved breeds of England, and is now the most generally diffused of all others. It has been undoubtedly formed by a mixture of the blood of the eastern hog with the ancient swine of the country. The great improver of this breed was Mr. Astley of Oldstonehall. The modern Berkshire, however, is of less size than the older breed; but still the animals are usually of the larger class of swine. Their common color is reddish brown, with dark spots; but many of the modern breed are nearly black, manifesting their near approach to the Siamese character; and sometimes they are black, broken with white, indicating the effects of the cross of the white Chinese. The Berkshires are generally regarded as one of the superior breeds of England, combining good size with aptitude to fatten, and their flesh is fitted for pork or bacon."

This last quoted article seems to settle the amusing controversy in some of the northern prints, as to white toes, white tails, &c., which appear here to be fairly accounted for. I have heard too, that a prevailing color in a parent stock, which has been crossed, will sometimes disappear, and then reappear in the progeny. There is in my possession a white sow, not a Berkshire, with a litter of seven pigs by a Berkshire boar, which is black and white; four of these pigs are perfectly white, the other three spotted-black, white and tawny or reddish.

The Hampshire hog I perceive is recommended by a writer in the 'Cultivator,' whose letter is republished in the August number of the Register. But from the following description from the 'Farmers' Series of the Library of Useful Knowledge,' vol. ii. British Husbandry, page 608, I should think it would not suit us better, if so well, as the Berkshires. "The Hampshire hog, of a white color, has been long celebrated as forming very superior bacon; but its character has been acquired more from its being fed, when young, upon the mast which abounds in the New Forest, and other wood-lands, and the mode of curing it, than from any inherent excellence in the breed of its

native country: being a coarse, raw-boned, flat-sided animal; but fattening kindly. Very few, however, of the genuine native hog are now to be met with, the common stock being either the Berkshire breed, or a considerable predominance of that blood in the native swine of the county; and subsequent crosses with that, as well as with the Suffolk and Chinese breeds, have produced an animal of a hardy nature, prone to get fat at an early age, and always to keep in good condition in a store state."

The best stock, however, will degenerate without proper food and attention—it is said that the hog requires less and gives back more for what it receives, than any other stock. But with us he is too commonly left to shift for himself until large enough to fatten, and yet costs more than he would under better treatment. Keep him in a thriving state from the first, and half the corn will fatten him that a poor starveling would require; and this is easily done without increasing materially the expense of farming. Indeed it is sound economy. It is stated in Deane's 'New England Farmer or Georgical Dictionary' (a most valuable work) that the late Arthur Young pastured 64 hogs, large and small, upon two acres of clover, from May until November. One of the best farmers and breeders I know, keeps his hogs in pens, or at most with the range of his farm yard, and has the green clover cut for them—estimating the manure saved as equivalent to the labor. It is probably the best plan. My own were kept on clover, with the aid of a few cymilins, in fine condition, until they were put up to fatten last year. The sows, and the shoats for this year's pork, were put up at the same time, in a pen to themselves, floored with logs and provided with a dry sleeping place. These were fed through the winter, and until they were turned upon a lot of clover enclosed for that purpose in the spring, upon boiled vegetables entirely—much after the plan of Mr. Ingersoll of Brookline, published in the Register, for January, 1839, pp. 31 to 37. They had no corn, but were in fine order all the winter, and are so now. The vegetables used were cymilins first, then beets, carrots, parsnips, from the garden, with some pumpkins, and lastly, ruta baga turnips, which carried them nearly through the month of April, when they were put upon the clover again. The boiled food was given three times a day with but little trouble—twice a day during the winter might possibly have been sufficient—and always given warm. Every morning at day break a fire was made under an iron boiler in which enough had been left overnight for the morning's feed—so soon as that was warmed, the hogs were fed and the boiler filled again—they were fed a second time when the hands came to dinner, and lastly at night, the swill remaining warm enough until that time. I think the corn and manure saved by this method must be a fair equivalent for the labor.

A plan for raising cymilins is given in the first volume of Skinner's 'American Farmer,' p. 367. I have pursued it for the last two years, and it affords me a supply of the best summer food, not only for hogs, but for my milch cows which are fed with it night and morning. They seem to relish it highly; it improves the quality and increases the quantity of milk; and I may safely affirm that finer butter and cream than mine cannot be found,

even in the justly famed market of Philadelphia. If the article last referred to, has not been published in the Register, I think you will find it worthy a place, and that any of your subscribers who will try the experiment will be remunerated by it fully.

Deane's 'New England Farmer or Georgical Dictionary' is doubtless known to you. In the course of a few years of imperfect farming, I have derived so much aid from it, that I cannot but wish a copy was in the hands of every farmer in the Old Dominion. If you have not the book, I wish you would get it, and if you find it such as I have described, consider whether it might not be republished (for it is nearly out of print) with great benefit to our good people, especially small farmers, and thrifty housewives; for it takes in the whole range of domestic and rural economy.*

TOBACCO—DUTY ON IT PAYABLE IN EUROPE.

From the American Farmer.

As the American Farmer has been adopted as the official organ of tobacco planters, and of intercommunication on the subject of their peculiar interests, and especially in reference to the grievance of high duties on it in Europe, and the best means of obtaining relief therefrom—permit me to make a suggestion or two, for the consideration of planters, and to invite discussion with a view to a better understanding on the points submitted.

It is a trite saying that there are two sides to every question; and that in regard to any doubtful one, before we adopt any conclusion, we should *hear both sides*! Now as to the question of high duties, there can be no doubt that they are enormous—and that they so much enhance the price of the article in Europe, as very greatly to diminish the consumption of American tobacco. Take for example the instance which has been exhibited by the convention at Washington, of which you were the secretary, and reflect on the astounding fact that Great Britain, by her high duties, levies on this single branch of American industry, a tax almost equal to the support of her navy—those "wooden walls" to which she is indebted for the support of her monarchy—the safety of her island from invasion, and for means of government and sway over sea and land to such an extent, that the sun it is said never goes down on all her dominions at once!—Look too at the vast sums

* The article referred to above will hereafter be republished in the Farmers' Register. The separate publication, for sale, of other agricultural works as well as Deane's, has been suggested to us by several persons, as likely to be advantageous to the public, and profitable to the publisher. In regard to the last point, we can answer, with confidence, that of neither of these, nor, as we believe, of any other book, if now published in Virginia, and no matter how great the merit or utility, could enough copies be sold, to pay the expenses of publication. Periodical works only can be sustained, upon previous subscriptions; and in no other way can any publisher venture to print a work, unless his object be to serve the public interests, without regard to his own.—Ed. F. R.

raised in France and other countries on this peculiar object of American production, and nothing can be more natural at first view, than the sense of wrong and the feeling of resentment and retaliation. But is there not another side of the question? we are not only to consider the amount of duties imposed in foreign countries, but, whether in these countries the cultivation of this odious weed is not altogether prohibited or virtually forbidden by high internal duties, and, how far, were it not for such prohibition, they are capable of producing tobacco for their own consumption, to the exclusion of the American article? If I am not misinformed, and that too by those who have opportunities of acquiring the most extensive and practical information on this subject, the capacity of France and Germany to produce tobacco for their own use, very far transcends in quantity the general American impression or estimate on that point. Permit me then to ask, respectfully, through the American Farmer, for more specific information in regard to their resources in this respect. Let me put the question to Mr. T. F. Bowie, Mr. Jenifer, Mr. Dodge, and other warm and able champions of this most extensive and important interest; whether we may not gain more by the privilege of exclusive supply under high duties to these countries where its growth is actually or virtually prohibited, than we should by a reduction of these duties accompanied by encouragements to grow the article? These foreign governments admit that the duty is excessive, but they contend that it is laid for revenue, and that if they deprive themselves of that, by reduction of duties to the standard which we would suggest, and to a level with our moderate duties on their manufactures and productions, that with such reduction we must expect them to commence the growth for self-supply.

What is the argument which has been used by our diplomatic agents in reply to this position assumed by foreign governments?—What is the actual capacity of England, France, Germany, and other countries to produce tobacco for their own use, under the most encouraging circumstances? And again is it not wise in us to let very well alone—submitting to high duties in a market where we have no rival. Observe, Mr. Editor, that I do not undertake to answer these queries in the affirmative. I only submit whether they are not worthy of very mature consideration. I ask only for light—with every candid inquirer after truth, you will say, let us banish prejudice, and view things not as we would wish them to be, but as we find them. Every one remembers the fable of the dog and the shadow. The culture of tobacco is, at this time, and under existing circumstances, with all the disadvantages of foreign exactions and monopolies, still the most productive object to which our slave labor can be applied. True, could we procure the repeal of high duties in the countries that we, and we almost exclusively supply, and at the same time be assured that in these countries the growth of the article would be forever prohibited by nature and by government, the prospects of the narrow tobacco belt of North America would be bright as the milky way in the heavens.—But let us not forget that

"Incident in Scyllam qui vult vitare Charybdim,"
is an old proverb to express the danger and the

frequency of encountering a greater calamity, in our eagerness to avoid a lesser one. Finally, Mr. Editor, let me repeat, that I ask only information and only seek the truth—the legitimate object of every
CANDID INQUIRER.

ROHAN POTATOES AND SASSAFRAS BUSHES.

To the Editor of the Farmers' Register.

October 20, 1840.

On the 31st March last I planted 40 hills from one Rohan potato, one eye in a hill, in two rows. Along side of the same I planted another row of the same length of 20 hills of the purple skin Mercer potato (said to be) which I have been raising several years. The whole of which were managed alike in the preparation of the ground they occupied and in the cultivation, save that whereas the Rohan potato hills had each one eye only, as before remarked, the Mercer potato hills were planted with the potato uncut. I planted the two kinds as above with the view of testing the superiority of the one over the other, thinking more had been said in favor of the Rohan than it deserved, as is very apt to be the case when any new article is brought to notice. When I dug them, however, on the 18th September last, I was disappointed; for the 40 hills of Rohan produced one bushel three pecks and a half. The twenty hills of Mercer produced three pecks. Difference in favor of the Rohan potato.

Whilst pen in hand, I will remark that I began to fallow a piece of land for wheat on the 20th August, 1839, and finished it on the 27th of the same month. Two-thirds of the said piece of land is what may be yet called new land, as I cleared it of its forty years' growth of old field pine about six years ago. The balance, one-third, being old land. On the 26th September following, I began to fallow the balance of the field (said balance being all old land,) and finished the operation on the 3d of October following. Began the same day, that is, the 3d October, to seed in wheat both the first and the last fallowing, and finished on the 8th of the same month, that is, October. Now, one of the facts that came under my observation relative to the crop of wheat is, that the wheat grown on that portion of the old land which contained about one-third of the piece of land first fallowed, as above stated, was very much infested with onions. It is true that this is a little matter, hardly worth notice perhaps, but if it may lead to a means by which we may avoid an excess of garlic among our wheat crops, it may be a matter of some importance. The cause, as I think, why the piece of land above mentioned abounded in onions, is to be found in the different periods of the year in which the fallowing was done, as before stated, together with the effects of frost. Thus: the piece of land on which so many onions grew with the wheat was fallowed at a season of the year which gave the onions (both seed and roots) sufficient time to vegetate and advance so far in their growth that the winter's frost did not kill them; whereas the balance of the old land was fallowed at so late a period that the onions, both seed and roots, not having sufficient time to arrive at that stage of maturity which would enable them to ward off the effects of the winter's frost, of ne-

cessity perished, or were so late in vegetating that they did not produce seed. If the above conclusions follow of necessity from the facts as above stated, it will yet be a matter of doubt whether a farmer could avail himself of them, owing to the generally received opinion of the utility of an early fallow, that the entire field which is the subject of the above remarks seems to sustain. If, however, a refallow were executed to the *depth of the first fallow*, (which in most cases I should think injudicious,) then the garlic would be sufficiently exposed to the frosts of winter to be destroyed, or their growth so far retarded from other causes as to fail producing a crop of seed. It may be asked, then, if it is necessary to refallow to avoid a growth of onions, why the remainder of the old land in my field did not produce many or but few onions, as there was no refallow? Because, from existing circumstances at the time, I was induced to fallow the whole field very shallow. This, I think, superseded the necessity of a refallow, so far as the onions are concerned. Enough about garlic.

I should like to have your views relative to one of my fields which is much pestered with *sassafras*. I will first give you a short sketch of the course of management relative to the same for some years previous to this time. That portion of the field over which the *sassafras* seems to be exercising almost entire control had been in corn every other year, with close grazing the intervening year, for many years, it being considered too poor to bring small grain, save only a few oats in detached spots, until four or five years ago, when I prohibited all grazing. This change, together with the manure previously applied has made it produce comparatively good crops, of corn and oats throughout, and I believe would bring more wheat a favorable year now, than it would oats previous to manuring and non-grazing. I have had a part of it in wheat since, and it is now seeded in wheat a second time. Indeed the whole of it would now bring a respectable crop of wheat, and I should put more of it in wheat, but the growth of *sassafras* bushes forces me to leave it to a less valuable crop in the spring; a part of that as usual will be unavoidably lost at harvest. Now, sir, what is to be done? shall I continue my present system, by which my land is evidently and rapidly improving, the *sassafras* gaining ground with equal rapidity, and perhaps greater, or shall I put up again my cross fences, and again subject the field to the hoof, the snout and the teeth, of every animal that can use them? I am disposed to take the latter alternative, thinking that two courses of rooting, trampling and biting will either destroy, or so far subdue them, that I can at less expense procure "the staff of life"—a plenty of good bread and good old Virginia bacon and their concomitants,—provided the latter alternative does not deprive the land of the power to produce these good things. Will it? Please give me your views in this matter. You see that I have written out my paper nearly, (though not quite my notions,) when I only intended to tell you about my big Irish potato. If you can make so much sense of this confused mass as to find out what I want to know about the *sassafras* bushes, and give me your advice about them, you will much oblige an old subscriber. Yours, very respectfully, R.

Having had to contend long with the same evil, and with as little success as our correspondent has
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had, we must confess our inability to prescribe for the destruction, or even the lessening, of the growth of *sassafras* bushes, on land that is not grazed, and rests from cultivation, as ours did, two years together in the rotation of four. But when the land is so highly improved as to allow a crop of either grain or grass to be made every year, and to be either removed for market, or food, or ploughed under for manure, then these annual operations, destructive to every first year's growth of the *sassafras*, may perhaps serve finally to extirpate the nuisance.—ED. F. R.

A STATE AGRICULTURAL SOCIETY FOR VIRGINIA.

The following paragraph was a private communication from a correspondent whose services in support of the cause which he here advocates have been among the most zealous and unwearied. We take the liberty of putting his words to other use, (besides that for which he designed them, as matter of private and friendly correspondence,) because they serve both as a text for our comments, and an excuse for returning to a general subject on which we have before labored so often and so fruitlessly.

"As it seems utterly vain to hope for any legislative aid to agriculture, I wish you would give us an editorial article in favor of a state agricultural society. Several of our sister states, I believe, have set us the example, and surely Virginia might be roused to imitate them in so highly laudable a work. Such an institution on the plan of the Scotch and English societies, to hold their annual meetings in different parts of the state, I am strongly inclined to believe, might now succeed. What say you to it?"

As to the scheme itself, there can be no doubt as to its great value to Virginia, if there is enough of public spirit, zeal, and even proper consideration of *private interest*, among all her intelligent agriculturists, to carry it into operation. But we fear, and grievously do we lament that such a fear should almost forbid the existence of hope, that a universal lethargy pervades the entire agricultural class, and has rendered them so torpid as not to be roused by any new efforts that we can possibly make. It is not that they want excitability, spirit and energy, on other subjects; it is to the claims of their own great and almost exclusive interest that they turn a deaf ear, and unsteady eye—and pay to it less attention than to other matters not to be named in comparison of importance and value. We mean not to depreciate the importance of the present all-engrossing and absorbing political contest, nor to oppose the opinion of any one of our readers, no matter which side he may support, that the election of his favorite candidate for the presidency is of the highest importance to the

country's well-doing. But this we will say, that if the people of Virginia had in all past time devoted to the sustaining of agricultural interests, and agricultural improvement, but one-tenth part of the zeal and effort which they have bestowed on the business of making or attempting to make presidents, we should have now a condition of agriculture as flourishing as in fact it is depressed, and the supposed abstraction from political labors would scarcely have rendered the action of government worse than it has been. But the present contest, which agitates the whole country, will now soon be at an end, (for which we are truly thankful,) and then, if ever, the members of the agricultural class may perhaps bestow some slight attention upon their own great interests. Again, however, our fears surpass our hopes. The state of collapse, and prostration of energy, that will succeed the present high-wrought political excitement, will be very unfavorable to induce men to give proper attention to a matter comparatively so tame and uninteresting as the general agricultural improvement of their country.

Still it is possible that we may be mistaken, and that there is better ground for hope than we can venture to assume. If, indeed, many intelligent men possess the proper feeling on which to form and to keep in operation a state agricultural society, there can never occur a time in which their proper action for that purpose would be more beneficial than now. Such a movement, properly made, might induce the legislature to do something for the same great end; and if that aid, as heretofore, should still be denied, such a society, as might well exist in Virginia, if operating as such a society should operate, might in a great degree supply the want of governmental action. But, as in all cases of agricultural societies, every thing of results would depend on the *working* of the society; and according to its first plan of operation, the same society might prove either worthless, even injurious, or in the highest degree beneficial to the improvement of agriculture.

We will not presume as yet to propose a meeting for the purpose of forming a state agricultural society. But we respectfully beg of all persons who are impressed with the importance of the measure, and are disposed to bear their share of the joint labors, to urge the matter upon others, and in some manner to indicate the extent of such wishes. If informed of any sufficient grounds for the movement, we will take upon ourselves hereafter to invite a meeting for this object at Richmond, at some specified and early time, during the approaching session of the legislature.

CROPS, REAPING MACHINE, &c.

To the Editor of the Farmers' Register.

Eastern Shore of Md. Oct. 20, 1840.

I see by the Register that the report of the cot-

ton crop to the south is very unfavorable, and also the wheat crop in Virginia; and I regret to say that the markets will find a diminished supply of wheat and Indian corn from this part of the country. The crop of wheat is short, and defective in quality, and I doubt much if the crop of Indian corn will equal half the product of last year. There has been partial sufferings from drought; but the great injury has been sustained from the cool season, which has been probably felt more to the north than with us: though, where lands are highly improved, Indian corn seems greatly to resist the influence of a bad season.

I understand several of Hussey's reapers were carried into Virginia, and used during the present year; the opinion formed of them by judicious men is a matter of much interest, in the wheat growing regions, and I have been disappointed in finding no account of the work done by them, in your state.*

The answers given to your queries in relation to the beneficial effects of marl are highly satisfactory; and I can add my testimony as to the improving effects on my farm. W. C.

PUBLICATION OF THE "SOUTHERN MAGAZINE AND MONTHLY REVIEW."

Our subscribers and friends will see by the advertisement on the cover of this number, that, in addition to the Farmers' Register, we propose, if sustained, to undertake the publication of another and distinct monthly magazine and review, devoted to literature, science, and general politics. This is not the place to speak of matters so foreign to the plan and contents of the Farmers' Register; and the subject is mentioned here, only so far as in connexion with the interest and well-being of this, the already established publication.

Many persons may infer that the successful progress of the new undertaking will be detrimental to the character and usefulness of the older, by the publisher of both being thereby overburdened with labor, both of body and mind. This is a mistake; and to ward off its possible effect on the Farmers' Register, we beg leave here to explain the grounds of the directly opposite position, viz: that the direction of, and editorial labor and difficulty of carrying on two publications of such different plans, together, will be less than of the existing one alone. Some knowledge of the general difficulties of the printing part of the business, in the southern states, would go far to establish this paradox, even in advance of the explanation to be offered.

When the Farmers' Register was first commenced, the undertaker designed only to be the proprietor, without even changing his then country

* We shall be pleased to have the testimony, desired above, furnished for publication. We have heard that while those who have tried Hussey's reaping machine concur as to its perfect performance, on wheat clear of moisture from rain or dew, yet that judicious farmers differ as to the economy of its use.—Ed.

residence; and had no expectation of being compelled also to become both publisher and printer, and to carry on every branch of the mechanical as well as of the intellectual part of the business. All that he had counted on was to furnish the matter, and to pay, at fair prices, for the printing and issuing the work. But a short trial showed the impossibility of having this done, properly and punctually, by contract, or by the agency of others. In the low condition of the publishing business in Virginia and the more southern states, (owing altogether to want of sufficient employment and support,) no man can safely conduct any periodical work, so as to comply with his obligations incurred to the public, without being his own printer—and it was soon apparent that this must be the resort for the Farmers' Register. Through all the numerous difficulties of such an undertaking, first in the country, and since in town, and with more causes of embarrassment and loss than any persons not more experienced can conceive, it was not until the present year, (which is the seventh of the editor's apprenticeship,) that the present state of things was reached. This is, a well fitted and supplied printing office, with enough of good hands, (all of which save one were first taught and trained in this office,) with every material and facility necessary for the publication of the Farmers' Register, or of any other work. But this long sought condition of things is accompanied by another important disadvantage to the interest of the property, that of the work of the office not being enough for the full and profitable employment of the establishment which it has been necessary to create, and which it is necessary to maintain, even if not fully employed. In this respect, then, it will require no more words to make it clear that a great increase of merely mechanical labor and business to the printing and publishing department, will not only increase profits, but will remove the greatest existing embarrassment and difficulty that can attend any business—the deficiency of full employment.

Next as to intellectual labor. The greatest source of perplexity and difficulty encountered in editing the Farmers' Register, (and which must apply to any agricultural periodical in this country,) is the scanty aid of contributors, and consequent small supply of materials in original matter—and, from the same general defect in all such journals, the barren field from which selections in general are to be culled. If the supply of materials were as abundant as it is defective, the editor's labor would be thereby diminished instead of being increased; or rather, the sore feeling and discouraging embarrassment, from his having, at most times, *nothing to do* of proper editorial labor, and yet being continually confined to his home waiting for the expected but uncertain arrival of the few materials necessary to prevent the actual

suspending of the printer's labors, would be exchanged for plenty of pleasant and useful employment, and the ability to prepare for the press, in a few days, what he has usually to wait for a month. Now, even if there is no change to be hoped for in this general and lamentable apathy of agriculturists in regard to their peculiar interests, and even if these difficulties of the Farmers' Register are to continue so long as it shall be published, (which may Heaven forbid!) still the adding to the editor's labors the publishing of a new work for which materials will be more abundant, because drawn from different and more abundant sources, will serve to fill up the idle and therefore most wearisome portion of his time; and even, after performing both duties, release him from much of the confinement now and heretofore caused by the mere want of materials to work upon, and the consequent risk of not furnishing regular employment for the printing establishment. The better, therefore, that either of the two publications may be sustained, the more beneficial will it be for the other.

It is proper to state that the two publications will not have the same proprietor, and therefore that the pecuniary transactions will be kept entirely separate.

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

The business of the present month has been more in the sale of goods, for the supply of the country generally, than in that of our own produce—the crops of cotton and tobacco (of 1839) having been nearly all disposed of.

An unusually large quantity of goods has been sold to make up the deficiency of the previous year or two. The prices of cotton, woollen and other goods of American manufacture, are extremely low—too low generally, to remunerate the manufacturer. The low price, however, tends to increase the consumption, and may thus react in due time.

The question of peace or war in Europe, arising from the differences between Turkey and Egypt, in which the great European powers take sides, remains undecided, and has of course an important influence on commercial arrangements and prospective operations.

Trade with China is suspended by the opium war, which Great Britain is waging against her. It is reported that a British force had destroyed the forts below Canton, and were about to make an attack on that city.

The crop of tobacco now beginning to arrive at market, chiefly by wagon loads in bulk, is of good quality, and in good condition, as the season has been favorable for curing it. Such commands, \$5 to \$6½ for leaf and in proportion for lugs, and in hogsheads higher prices, up to \$8 or more. Old leaf, \$6 to \$9½, &c. European markets are brisk, and shipments of the last crop bid fair to pay good profits, which will cause the present one to sell well.

The year's receipts at New Orleans were 44,000 hhds., and the exports 41,000, of which 25,000 to

foreign ports. The inspections in Virginia 58,000, of which the foreign export of the year ending 1st instant, was 27,400, and about 8,000 hds. more will be exported this month. Although the crop was unusually large, the previous one having been on the other extreme, left all markets bare, and prices are consequently supported.

The crop of cotton (of 1839) is stated at 2,178,000 bales, to which may be added about 37,000, manufactured in the western and southern states and not included in the statement. Of this, 1,880,000 were exported to Europe, and about 333,000 manufactured in the United States.

The weather during this and part of the preceding month has generally been favorable, and this may counteract to some extent the injury by previous excess of rain and by caterpillars. It, however, the present severe frost, (October 26,) the first we have had, extends to Alabama and Louisiana, it may diminish the product materially: but after so large a crop as the last (800,000 bales more than that of 1838,) there can be no deficiency of supply, even should the present be a small one. The picking season, as yet, has been entirely favorable and the quality is good. Price of new in Petersburg 9½, in Charleston 8½ to 9½, in Mobile 8 to 10½, in New Orleans 8 to 11, (not including the lowest qualities,) and with a tendency to decline in all these markets.

Supplies of wheat in Richmond and Petersburg continue very limited, and prices 3 to 5 per cent. higher than those of Baltimore, Philadelphia and New York, where quotations are 90 to 105.

The quantity of flour and grain cleared at Buffalo and Black Rock for the Erie canal to 1st October, in the last four years is thus stated:

1837,	60,000	bbls. flour,	341,600	bushels wheat.
1838,	157,000	" "	492,000	" "
1839,	206,000	" "	506,000	" "
1840,	528,000	" "	694,000	" "

And this is exclusive of the vast quantity produced in the extensive and fertile country east of Buffalo, and of the large shipments, from ports on the lakes, direct to Canada.

The export of flour and grain to England has nearly ceased, the present rate of duty amounting to prohibition.

Indian corn 45 to 48 cents. No sales yet of new crop.

Arrangements are *certainly made* by the banks of Philadelphia for the resumption of specie payments on 15th January, and consequently those of Maryland and Virginia will resume about the same time. X.

October 26.

NOTES OF AGRICULTURAL PRACTICES ON THE GREAT PEEDIE, S. C.

Extract from the Southern Cabinet.

Having given a general survey of this section of country, we will now enter somewhat more into details. The systems pursued by those who cultivate the swamp-lands are similar; as well as by those who cultivate the high land. There are differences in the details; but we can only mention a few, as we proceed on, for it would occupy too much of our limited space to enter into particulars. We shall select Col. Williams' plantation on the Great Pee Dee, as illustrating the practices of the planters on the river-swamp lands, and that of

Gen. Gillespie's, that of the up-lands. We will commence with Col. Williams', which was the first we visited, and with the details of the management of which, we became better acquainted than with that of any other.

The soil of the river-swamp plantations we have already described. It is generally what may be called a sandy loam, becoming a clayey loam as you approach the high-lands. There are spots of clay, and sandy ridges, but these are not frequent. By far the largest portion is a fine black friable soil, about six inches deep, resting on a clayey substratum. The principal crops cultivated are cotton and corn—potatoes only in very small quantities; rye for early pasturage, and oats principally for turning under as manure.

Cotton, preparation of the land for, and culture of.—About one-half of the land intended for cotton is manured with compost taken from the cattle-pens, stables, &c. The balance required to make out the quantity needed, is taken from newly cleared grounds, or fields which have been rested one year, and the growth turned under, or which have been manured by the turning under of a crop of green oats. The oats sown for this purpose are put in, in the months of October and November, at the rate of one bushel and a half per acre, and the ground thrown into ridges of the width intended for cotton the succeeding year. By this operation the oats are covered. In July, (or as soon after, as other work necessary to be done will permit, sometimes not until late in August,) the oats are turned under, reversing the ridges, and burying them completely. In the spring following the ridges are again reversed, (at which time the oats are found to have entirely rotted,) and the beds formed. Occasionally, manure is used in addition to the green crop turned under, but this is not often done. When the oats are turned under late, the seeds having matured, there is another growth of oats, which, with the weeds, form sometimes a pretty thick coating, all of which is of course turned under, or, as is sometimes the case, listed down previous to reversing the beds. When the fields have been rested, all the growth, which is considerable, (for no cattle are permitted to pasture on them,) is listed under as early in the fall as practicable. If not done early it is preferred to turn it all under with the plough, so as to mix it more intimately with the soil. Gypsum has also been tried with decided success, the seeds merely wetted, rolled in it, and planted.

Those fields which the year previous were in cotton, and which it is intended to plant again with the same crop, are prepared by running a mould board plough twice in the centre of the alleys and forming as deep a furrow as possible, the bull-tongue follows breaking up the soil still deeper. These furrows are then filled with manure from the various pens. The beds are formed by the plough and dressed over with the hoe. The trenching plough (already described) is run on the top of the beds, making them smooth and forming the trenches, into which the seeds are scattered at the rate of two bushels per acre, and covered by the horse-rake. The beds are formed from four to six feet apart, and very wide at the base, nearly meeting in the alleys.

The first working is done with the hoes going over and lightly shaving down the beds. This also makes them smooth and prepares them for the second operation, which is with the "scraper." The cotton is thinned at the first working, leaving

a single stalk not nearer than eighteen inches and not more than three feet. The after culture is performed nearly altogether with the skimmer, which shaves the surface of the beds, throwing a little earth up to the cotton. The hoe follows, merely going over the tops of the beds, and those spots where the skimmer has not worked well, or cannot approach. A skimmer does three acres per diem. An able bodied hand will do from fifty to one hundred rows of two hundred and ten feet in length, according to the grassiness, &c. of the fields. The fields are gone over from every ten to fifteen days. The *Petit Gulf seed*, as we have elsewhere said, alone is planted. The yield from this is an average of one thousand pounds of cotton per acre. From thirty-five acres Col. Williams has gathered two thousand one hundred and ninety-six pounds per acre. The pickings are usually accomplished in from one to three times going over. The ginning is done on one of the plantations by water power—on the others by animals. Houses for the reception of the cotton are built in several parts of the different plantations, especially when distant from the main settlements.

Corn.—In the rotation adapted by Col. W., corn usually follows cotton. The furrows are run across the beds, and so deep as to bring the bottom of them to a level with the alleys. The corn is planted exactly where these furrows intersect the old beds, and where there is a quantity of manure remaining from that used for the cotton. Sometimes additional manure is applied. This most generally (if not always) is cotton seed, whose vegetative powers have first been destroyed, in quantities of about a pint, which is put in the holes. If the fields have been resting, the whole ground is broken up completely and turned over. It is then laid off five by six, and the corn planted, and when up thinned down to from two to three stalks. The first working is performed with the bull-tongue plough, by which the ground is thoroughly and deeply broken up. It is afterwards cultivated quite shallow, with the scraper, which is run both ways. When laid by, it receives a slight hilling but not before. The usual product is thirty bushels per acre, and sixty bushels have been gathered. We have already described the variety of corn cultivated by Col. Williams, which he has brought to its present productive state by long and careful selection. In producing many ears, it resembles the "Baden," but the stalks, ears, and grain, are infinitely larger, and in this respect differs not materially from the corn usually cultivated in the state, but in productiveness far exceeding. We counted on a dried stalk seven large shucks, (the corn had been taken out to plant.) This corn is not purely of one sort, but seems to be a mixture of several, for among it you can find all of the varieties of grain from pure flint to Tuscara. The ears differ also in size, having from eight to sixteen rows. The grains are usually of good size. We hope the colonel will carry his selections still further, and get rid of all the small sized ears, unless he discovers that these are the most productive—then of course get rid of the other. That which is best should be retained, and the rest discarded, for they cannot all be equally good. A fact was mentioned to us, which was certainly unknown, not only to ourselves, but to all the planters of this section of the state, with whom we have conversed on the subject. It is, that the first suckers from corn, if left undisturbed,

will always produce ears on the stalk, similar to the parent stalk, and not an abortion on the ends, as we so often see in our fields; and in confirmation of this, we were shown four dried stalks, which had grown in such close proximity, as to have all the appearance of being the parent stalk and suckers. It was out of the ground, and divested of soil, but the mass of roots was so thick that we could not ascertain positively, without separating and thus destroying the specimen, (which we were not willing to do,) whether they proceeded from one or more roots—the appearance decidedly was, that the whole sprang from one. We counted on each of these stalks two large ears, with no greater difference between them than might be found between adjoining stalks. Col. Williams first mentioned the fact to us, and in conversing on the subject before one of his overseers, (who had, by-the-by, been with him a number of years,) the latter observed that he thought every person knew it. The abortions we have on our suckers are attributed to their not being the original or first, but such as had been thrown up a second time by the plant which is said not to produce ears at the sides, but merely a few scattering grains on the tops of the stalks. We have mentioned these facts to many of our planters in this section of country. None have made observations sufficiently accurate, to speak positively on the subject, though the general opinion is, that such is not the case in the lower country. *Is it not one of the peculiarities of the corn cultivated by Col. Williams?* We would be glad to receive communications on the subject from some of our friends.

Oats are principally cultivated for turning under as manure, and seldom more is saved than will answer for seed the ensuing season, unless there appears likely to be a deficiency in the corn crop. When this is apprehended, as much is gathered in as it is supposed will meet it, which is done, not by cutting and thrashing in the usual way; but the hands are sent in and merely strip off the grains from the stalk, leaving the latter standing. In this way each hand gathers sixteen bushels per diem, and on one occasion twenty-four were gathered. This is supposed to be fully equal to cutting down and thrashing it out; and there is this advantage, that the stubble is left on the field to be turned under as manure.

Rye.—This is only sown for early pasturage, and as there is generally more sown than can be eaten down, a considerable quantity runs to seed, on which the hogs are turned as soon as it is ripe.

Peas are very little attended to, a small quantity being planted near the settlements, into which the cows are turned after harvesting the crop. None are picked except for seed.

Sweet Potatoes.—Not cultivated as a crop. A small quantity is usually cultivated, which is given to the negroes as a luxury, and never forming any portion of their week's allowance.

Hay.—It is seldom that any attention is paid to the making of hay, as it is never considered worth the attention of the planter, it being too costly to send it to market, and there being usually as many corn blades or leaves as will suffice for the use of the plantation, corn being planted in large quantities. We still, however, hope to see it yet supplying the place of northern hay in our market. When the ground is broken up in May and June, the growth of crab or crop grass is very heavy, being four to five feet high. Col. Williams had

never ascertained the weight per acre, but promised to do so the present season, and inform us of the result.

Manures, and their application.—We were much gratified on ascertaining the great attention paid to the collection and application of manures in this section of country. Every where we visited, this branch of agriculture appeared to be deemed of primary importance. We were too late to behold the large accumulation on the different plantations, but we saw preparations making for the collection of a new supply for the succeeding crops. The plan usually is, to cart the corn and cotton stalks into the pens as opportunity offers, and constantly to accumulate in them, pine and oak leaves on which the cattle are nightly penned. This compost, when applied to cotton, is spread in the furrow at the rate of an ox-cart-load for every fifty yards square. To corn it is applied in the hill.

Cotton seed is highly prized here as elsewhere, as a manure for corn. The practice varies. By some it is applied under the corn, but most generally above, in quantities of from one to two pints to the hill. That which is applied under the corn gives the most luxuriant growth, whilst young, and hence is apt to mislead the planter; but when earing time arrives, it is found not to be equal to that to which it has been applied later and on the hill. It is highly probable that a large portion of its good qualities become exhausted before the corn requires it at earing time, and that it will be more efficient if applied later—still, however, it appears to us, that placed on the top of the hill, and left so long exposed to the action of the weather, must also exhaust its valuable properties. Would it not, therefore, be better to have the first furrow run near, (throwing the earth from the corn, the cotton seed placed in these furrows opposite the hills on each side, the earth returned by the plough and the seed covered. The whole strength of the manure would, in this manner, be retained; and when we recollect that the valuable properties of cotton seed reside almost entirely, if not wholly, in the oil it contains, and that this is easily and rapidly dissipated by heat, we may, perhaps, see the utility of removing it from the immediate and direct influence of the sun, and interposing a medium which will absorb and retain the gases as they are disengaged. There are probably no salts of consequence to sink, and the loss sustained by this species of manure, is by evaporation, not infiltration. Cotton-seed is also applied to cotton, (sometimes mixed with other manures,) being spread in the furrows at the rate of from thirty to forty bushels per acre. A curious circumstance connected with the application of cotton-seed as manure was mentioned to us by Col. Williams. Many years ago he manufactured oil from cotton-seed, and applied the refuse as manure. He found that when the cake was used in pieces larger than about four inches square to the hill, the plants were decidedly injured. In one instance it was applied at the rate of between three and four hundred bushels per acre. Not only the crop was destroyed by the application, but even the fertility of the soil for many years.

Gypsum has been used with decided success, as a manure for cotton: but the difficulty in obtaining it, has prevented its more general use. The seeds, in all the experiments, were merely rolled in the plaster. In one field in which every alternate five rows were thus manured, the growth

differed so much in color as to give a riband-like appearance to it. There are some experiments making this year, which we hope to have reported in future numbers of this journal.

In clearing new land, Col. Williams does not permit any thing to be burned, but buries as much as possible. The larger logs, which cannot be so readily got rid of, are piled up in different parts of the field, and when they commence rotting, they are moved every year or two, thus manuring the portions of field where they happen to be.

Two other modes of improving his soil, have been resorted to by the Col. with decided success. The first is by altering their textures by the intermixture of sand with clay and clay with sand. The improvement has been decided and great. Clayey soil is more improved by the carting on and admixture of sand, than is sand by the admixture of clay. Considerable quantities of ground have, in this way, been improved.

The other mode has been by under or sub-soil draining. This has been resorted to with great effect, and we saw several acres of swampy marsh ground, which in its original state produced only rushes and the usual growth of such lands, entirely reclaimed, as dry as any other part of the field, and judging from the old stalks of corn, it had produced a better crop. This piece was the first attempt made by Col. Williams, with which he has been so thoroughly satisfied that he has underdrained all the land in his extensive fields which require it.

TO SUBSCRIBERS, IN REGARD TO CONDITIONS OF THE FARMERS' REGISTER FOR VOL. IX.

Every individual whose name is on the subscription list of the Farmers' Register is respectfully requested to read and consider the following remarks, with the same degree of attention as if they were addressed to himself specially and particularly.

For the last two years, a continued effort has been made, at great risk and cost to the publisher, by means of a reduction of the price contingent on certain conditions, to extend the circulation of the Farmers' Register, and thereby to increase its beneficial effects on agricultural and general interests. (See the Conditions, and appended remarks, at page 639 of vol. vii.) The expected benefit to the public, so far as found in the extended circulation of the work, has been considerable; but not enough so to compensate the publisher for the additional outlay for the much larger increase of the copies printed of the two last volumes (7th and 8th) made, in misplaced confidence of the liberal offers being appreciated, and more fully met, by the agricultural public. However, it is not for the publisher to complain on that score. The like contingent reductions of prices, for advanced payments, will be continued, with slight variations, which will not be less advantageous (if availed of) to subscribers, and which are required because of the many cases of misunderstanding of either the let-

ter, the intention, or the operation, of the conditions referred to, by new subscribers who did not take the trouble to read or consider them. Thus, many have been misled, either by their own inattention, or the incorrect verbal representations of others as careless; and in almost every such case, the subscriber, (if not, as is very often found, totally disregarding of all obligations,) considers that his own erroneous and unfounded impressions, received without reading, or attending to, the plain letter of the published conditions, should fix the rule of construction, and the measure of his obligations. It is in the hope of leaving no possible ground hereafter for such disagreeable differences of opinion, and controversies, and for the many losses of debts thence accruing, (in addition to all other previous and general losses,) that the slight changes have been adopted as to the *extra copies* of the publication offered by the conditions, formerly and now.

With these views, the general 'Conditions' for the 9th volume now published in this number, are restored, in purport and substance, to what they were originally; and the *extra allowances* for advanced or early payments, are offered separately as *premiums* to such subscribers as may choose to avail of the benefits, and thereby aid the object of extending the circulation of the work, and putting the publication as much as possible on the footing of the *advanced "cash system."* And it is hoped that both the general conditions and the premiums are stated so distinctly and fully, that there will remain no subject for misconstruction.

It may be seen that every existing subscriber, who shall make payment for vol. ix., clear of all deductions, and in advance of the commencement of the publication, shall receive a premium of an *extra copy* of the same; but *to be directed to his own name*, instead of, as before, to the name of some new subscriber.

If the payment is delayed, but not longer after being due than the issue of the 6th number of the volume, still the subscriber may receive an *extra copy* of either vol. 7 or vol. 8. To extend the limit of time still longer would be equivalent to offering a premium for *delay of payment*.

The subscription for any *additional copy*, made thus hereafter, will be discontinued, as a matter of course, at the end of that particular volume; thus leaving the subscriber free to renew the like arrangement, or not, as he may choose, for another and for every succeeding volume. While it is hoped that this change in the direction of, and in the duration of the subscriptions for, the *extra copies*, will leave no possible ground for mistake and unpleasant disagreement, its effect will be, as to every subscriber who chooses to go upon the *system of advanced cash payments*, or even of early

payment, to give to him an *extra copy* which he may dispose of as he pleases—whether to any other old subscriber, whose subscription is *in due time discontinued* for that purpose—or to any other destination, more advantageous to the circulation of the work, and the profit of the publisher.

Every subscriber, therefore, may choose whether he will put himself upon the *credit* or the *cash system* of payment; and if the latter, it must be observed that the limit of the 31st of January, or the time of issuing to the subscriber his first number of the volume, *will be strictly adhered to in all cases*. And, though it cannot be rightfully or properly *required* by the publisher as a condition, it will be greatly to his pecuniary advantage if every such order, for *additional supply*, as well as every intended order for *discontinuance*, should be sent in as early as the *first day* of January, when the printing of the new volume will be commenced, and the number of copies of the edition must be determined on and fixed for the year. While, of course, the publisher desires to retain the support of all the present subscribers, and is thankful for the continued support of each one, still, he desires to retain no subscribers' names against their will, or in consequence of the commencement of a new volume, and the consequent renewal of their obligations, coming on them by surprise. Therefore, as in former cases, he notifies all of the approach of that time three months before its arrival; and earnestly asks, as a personal favor to himself, that all who have determined to discontinue their support to the work will give the proper notification thereof, and as early as may suit their convenience.

CONDITIONS OF THE FARMERS' REGISTER, FOR THE NINTH VOLUME, TO BE COMMENCED JANUARY, 1841.

Article I. The Farmers' Register is published in monthly numbers, of 64 large octavo pages each, at \$5 a year, payable in advance. [See also "PREMIUMS" below.]

II. All mail payments must be made in bank notes, or checks, of PAR VALUE in VIRGINIA—or otherwise of a CITY bank of the state in which the subscriber resides;* and all letters to the publisher (except such as contain articles for publication) must be POST-PAID; and the publisher assumes the risk of loss by mail-carriage of all letters and remittances conforming to the foregoing con-

* It will be *again* required (as formerly) that mail payments shall be made in the notes or checks of *specie-paying banks*, should any such banks be in operation in the states in which subscribers severally reside. Until then, the publisher, like all other creditors, and laborers at fixed prices, must submit, as now, to be defrauded by the operation of the non-specie-paying banking system, of the difference in value between the *best* of such bank paper and specie.

ditions, and which have been *properly committed* to the mail, or to the hands of a postmaster.*

III. If a subscription is not directed to be discontinued before the first number of the next volume has been published, it will be taken as a continuance for another year. Subscriptions must commence with the beginning of some one volume, and will not be taken for less than a year's publication.

IV. The mutual obligations of the publisher and subscriber, for the year, are fully incurred as soon as the first number of the volume is issued; and after that time, no discontinuance of a subscription will be permitted. Nor will a subscription be discontinued for any earlier notice, while any thing thereon remains due, unless at the option of the editor.

Address— EDMUND RUFFIN.
Petersburg, Va., Oct. 31, 1840.

PREMIUMS IN EXTRA COPIES, OFFERED IN CONSIDERATION OF EITHER ADVANCED OR EARLY PAYMENTS.

1st. To every subscriber who shall pay for vol. 9, *strictly* according to the above conditions (in

* "A postmaster may enclose money in a letter to the publisher of a newspaper, to pay the subscription of a third person, and frank the letter, if written by himself. (Signed) Amos Kendall, Postmaster General."

Articles I. and II.) before January 31st, (when No. 1. will be issued,) an extra copy of the same shall be sent; or instead, if preferred by him and so ordered, a copy of either vol. 7 or vol. 8. In like manner, and at same rate of deduction, any one person may obtain any number of copies to supply others.

2d. To every subscriber, not thus paying in *advance* of the publication, but who shall do so, and in all other respects comply with the above conditions before June 30th, an extra copy of either vol. 7 or vol. 8 shall be sent; and the same to every new subscriber, paying as above required (in Art. I. and II.) at the time of his subscription being ordered.

Remarks.

Any extra copy, sent as above stated, will be directed only to the *name* of the individual entitled to it as a premium; but sent to any post-office that may be desired. The sending of every such *extra* copy will cease with the volume; but the like arrangement may be renewed, and similar advantages obtained by any subscribers hereafter, upon the renewed performance of like conditions.

No agents, or general collectors, are employed for the Farmers' Register. But any subscriber, postmaster, or other person, may obtain for his own profit the large allowances offered in the foregoing premiums, by procuring the benefits to the publication for which the premiums are offered.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

HOLSTEIN DAIRIES.

From the Journal of the English Agricultural Society.

"The pride and boast of the Holsteiner is his dairy; and the fame of Holstein butter, which, if we except that made in Holland Proper (or Delfland,) may well claim to be the best in the world, not only justifies his preference, but may render a sketch of those peculiarities of management, by which the Holstein dairy system is more especially distinguished, neither uninteresting nor useless to the English farmer. These may be chiefly classed under four heads, viz.: the buildings and utensils; the time of milking, and number of hands employed; the management of the milk; and the mode of working, salting, and packing the butter.

The buildings indispensable to a large dairy (which varies from 100 to 400 cows) are, a milk cellar, a butter cellar, a churning house, (and closely adjoining the horse-mill, by which the operation of churning is invariably effected,) a cheese room and a kitchen, in which not only the various utensils are washed, but the food cooked for all the persons immediately engaged in the dairy-work; to which must commonly be added their sleeping and eating apartments, as, on large estates, the whole of the establishment is usually kept apart from the mansion house. The size and site of the milk cellar are esteemed matters of first rate importance: it ought to front the north; be shaded from the southern sun by rows of trees—elder being especially selected for this purpose, and indeed placed if possible near the windows, on account of their influence in keeping off the insect tribes; and a thatched projecting roof is preferred, affording greater protection from the heat: while, in choosing the site, peculiar care is taken to place the dairy beyond the reach of every thing calculated to generate bad odors, or in any way taint the atmosphere. The size of the milk cellar must necessarily be regulated by the number of cows: but it should always be calculated to contain the produce of four milkings; and as the milk dishes usually occupy a space of two feet square, the produce of 100 cows, giving on an average 8 quarts per day, (a large average for the cows of this country throughout the year,) would fill 50 milk dishes at each milking, and would require a ground surface of 500 square feet, as the milk dishes are invariably placed on the floor, the amount of each milking a little apart; and there must unavoidably be spaces left, to enable the dairy maids to go through their various operations of skimming, sieving, and removing cream, &c. The floor, though sometimes flagged, is more generally of brick, neatly fitted, so that no water may lodge in the joints; and always gently inclined, with a grated opening at the lower end, to facilitate the mopping and washing of the floor, which is never omitted to be done twice a day, notwithstanding that every avoidable impurity is carefully guarded against, and every drop which may fall at the time of the milk being strained, is instantly wiped up. A great improvement has

been recently made in some newly arranged dairies, by dividing the floor into compartments with brick ledges, from 3 to 4 inches high, between which the milk dishes stand; and the compartments (the lower extremity of which is fitted with a small sluice) being filled, by means of a pump, with cold water twice a day, the milk is preserved so cool as to prevent all approach to acidity for several hours longer than when placed on a dry floor: thus affording, even during the summer solstice, sufficient time for a complete separation of the milk and cream, without which the full proportion of butter cannot be obtained. For effectuating the same desirable result, ice is frequently resorted to in sultry weather, either by dropping a piece of pure ice in each milk-pan, or by placing a pailful in the dairy, which, by giving off its cold, sensibly lowers the atmospheric temperature.

It is considered necessary that the milk cellar should be sunk from 3 to 4 feet in the ground; be from 16 to 18 feet high (the best have an arched roof, as being more conducive to coolness than boards); and be furnished with two rows of windows, (and, if possible, on three sides, north, east, and west,) to secure a thorough air. The lower range consists of wooden trellis work, provided inside with gauze frames to exclude insects, and outside with hanging shutters, which can be lowered and elevated at pleasure. The upper range is furnished with glass sashes when light only is requisite, which are exchanged for gauze frames, when more coolness is desirable. The butter-cellar also, must be light, airy and cool; being likewise sunk in the ground, and the same precautions adopted as in the milk cellar, to secure an abundant current of pure air. In it the butter, when carried from the churning house, is worked, salted, and packed; and the filled butter casks ranged on clean boards, somewhat elevated above the floor, to admit a free passage of air, are weekly turned and wiped.

Next in order comes the churning house, which differs in no respect from similar arrangements in England, excepting that, of late years, the perpendicular movement of the churn staff has been exchanged for the rotatory,* which is found to churn in a shorter time, and with less risk of producing, even in hot weather, what is called oiling.

The cheese room is never admitted near either milk or butter cellar, and is, in newly arranged dairies, placed as far as may be from them. In fact, as cleanliness forms the great object of the Holstein dairy system, the closest attention is paid to guard against every impurity, and to remove every thing from the vicinity of the dairy which could by possibility exercise a sinister influence on the very susceptible substances of milk and butter; which suffer, to a degree those unaccustomed to observe it would little suspect, from a tainted atmosphere. As the preparation of cheese is better understood in England than here, I will only mention that three sorts are made—sweet milk, skimmed milk, and occasionally what is termed cream cheese; and shall now proceed to describe the man-

* Seventy-two revolutions per minute.

agement of the milk, first enumerating the number of persons required. These consist, in large dairies of a meyer or overseer, a cooper, one or two cowherds, (as may be requisite,) one or more swineherds, an upper dairywoman, and dairymaids in the proportion of 1 to every 18 cows. The overseer's duty involves a general charge of the cattle, whether in health or sickness, with a competent knowledge of their diseases and the remedies; he is responsible for the swine being properly cared for; that the calves, whether fattening or rearing for stock, are regularly and suitably fed; that the cowherd does his duty; that the hours of milking are punctually adhered to; and that every thing and every person is in proper place and keeping. He must further pay strict attention that the cows are milked thoroughly out, on which so very much depends; as not only the cow which is allowed to retain any portion of milk diminishes her produce by so much from day to day, but the last, being by far the richest part, a loss of butter is incurred much more than proportionate to the quantity of milk, by this culpable negligence or laziness. According to the observations of an accurate examiner, Dr. Schubler, the first drawn milk contains only 5, the second 8, and the fifth 17 per cent. of cream! If the number of cows be not above a hundred, the overseer can also undertake the cooper work; which, when wooden milk dishes are used, in addition to the cream barrels, milking pails, and butter casks required in the course of a year is a consideration both of time and expense. But in large dairies, a cooper is kept in addition, who, however, must likewise milk a certain number of cows, assist in carrying the milk, feeding the cows when housed, or any other dairy work which a man is capable of. The wages of these two persons vary according to the extent of the dairy, but may be averaged the first at 60, and the second at 40 dollars per annum.

The dairymaids, besides milking, cleaning the vessels, &c., work in the garden in summer, spin in winter, and wash, bake, brew and cook for their own establishment, under the superintendence of the upper dairywoman, who is by far the most important personage in it, as on her skill, attention, and diligence depend, in great measure, both the quantity and quality, and, by consequence, the profit of the produce. She must not only thoroughly understand, but accurately observe, the moment when the milk should be creamed; the degree of acidity it must attain in the cream barrels; its temperature, whether requiring the addition of warm or cold water to the churn, as well as the all-important operations of kneading, beating, salting, and packing the butter. She must not only be punctiliously clean herself in person and work, but keep a strict eye over the cleanliness and order of her subordinate maidens. In very large dairies the upper woman has full employment, without milking, and needs the assistance always of one, and sometimes of two, of the more experienced dairymaids, in butter and cheese making; but in smaller establishments she milks a certain number, generally 10 cows, while each of her subordinates have 18; her wages are usually 55 to 60, that of her chief assistants 22, and that of the others 18 dollars per annum.

During summer the dairy people must rise at three and even two in the morning, if the weather be very hot; for which they are indemnified by

two hours' sleep, from 1 to 3 in the afternoon. At 4 they commence milking, which takes place in the field, and generally occupies two hours. At the beginning of the season each girl marks her own cows by tying a particular colored ribbon round their tails, and in some places they adopt the precaution of the milkers carrying a string on which they cast a knot as each cow is successively milked, thus securing against one being forgotten. As the fields are large, and often at a great distance, the transport of the milk is facilitated by the very simple contrivance of a long, low, four-wheeled, one-horse wagon, in the side bars of which strong iron hooks are inserted, at such distances that the milk pails, containing from 30 to 40 quarts each, may swing free of each other, and these, though filled nearly to the brim, are prevented spilling, notwithstanding many a rude jolt over the rough, and often deeply rutted road, by merely having thin pieces of wood, about the size of a dinner plate floating on the surface; a practice, indeed, universal in these countries, when pails with any liquid are carried even in the hand. The milk when brought to the dairy is immediately strained through a hair sieve into the vessels, whether of wood, earthenware, copper tinned, zinc, cast-iron, (lined with a china-like composition,) or glass, placed in rows on the floor. All these different kinds of utensils have been tried with various success, in the hope of discovering how, in hot weather, more especially when a thunder storm is gathering, the milk can be guarded against a too early acidity; for, as it is a fixed and invariable rule that the cream must be removed from the milk before the latter gets at all sour, and an equally established fact, that all the oily particles cannot be obtained in a shorter period than 36 hours, vessels in which, during sultry, and especially damp weather, the milk could be kept the due time, are a great desideratum. As yet, however, there reigns much diversity of opinion on the subject, and shallow wooden vessels, as nearly as possible equally wide at top and bottom, containing when full about 8 quarts, but in which during summer seldom more than 6 quarts are poured, are in most general use. The tinned copper milk pans are very costly, and must be carefully watched lest they should require retinning. The zinc are as yet little known, and the assertion of their effect in better severing the cream from the milk, not sufficiently proved. The cast-iron, lined with enamel, though assuredly durable and very clean, seem too expensive; and the glass have many opponents on account of their brittleness, and the vague notions respecting glass and electricity inducing the idea, that if the electric fluid get into the milk it cannot get out again! Whereas, as it is ascertained that it always attaches itself to a conductor, and, in the absence of any thing more attractive, runs along the surface, it is more likely that the milk should be protected in glass, which is a non-conductor, than in any other substance. In my dairy which contains upwards of 180 cows, the glass vessels have been used for 4 years; and I give them a decided preference over all others. Their form is good, being 16 inches broad at the top and 12 at the bottom; the glass is dark bottle-green, transparent; and perfectly smooth, about one eighth of an inch thick, and provided with a rounded rim at the upper edge which makes it easy to retain a safe hold of them even when full. They contain 8 quarts, but never

receive more than 6. They cost 8d. a piece, and their durability may be estimated by the fact, that to encourage carefulness, each dairy maid is allowed one dollar per annum extra, as *pan money*, being bound at the same time to pay 10d. for each one she breaks, yet hitherto no girl has broken to the extent of her dollar. It is self-evident that acidity cannot be communicated to glass, and the ease and rapidity with which they are cleaned, requiring merely to be first washed with lukewarm water, then rinsed in cold water and placed in a rack to dry, effect such a saving in fuel and labor (diminishing the number of our dairy maids by at least 2,) that the less quantity of butter obtained, supposing (which I by no means concede) that the milk, during a few weeks in summer, does sour sooner, and consequently throws up less cream in glass than in wood, is more than compensated by the lessened expense of the establishment, not to mention the great advantage of attaining the indispensable cleanliness and purity of the vessels, with more certainty, because at a less expenditure of time and trouble. Although it is an ascertained and undeniable fact that the quality of butter depends much on the nature of the pasture, the locality of the dairy, the universally prevailing cleanliness of the whole management, and very essentially on the purity of the water employed, still I ascribe much of the reputation which our butter has of late years enjoyed (and which is verified by our obtaining at all seasons one penny per pound above the market price in our neighborhood) to the beneficial introduction of glass milk dishes.

It has already been stated as a rule, that the cream must be removed from the milk before any acidity is perceptible, if butter of first rate quality is looked for; and it has been found by experience that a cellar temperature of from 60° to 62° Fahrenheit, is the most favorable; a complete disengagement of the cream then taking place in 36 hours: whereas a greater degree of warmth, though it quicken the separation, still more hastens the souring process, which operates injuriously not only on the quality but the quantity of butter. In a cold temperature, the separation is effected much more slowly, so that 48 or even 60 hours may be required; this, however, is the longest period that may be accorded without incurring the risk of imparting a rank, unpleasant flavor to the butter, which even if not perceptible on its being first churned, manifests itself very shortly afterwards.

The commencement of acidity in milk is indicated by a very slight wrinkling of the cream, and a scarcely perceptible acid taste. So soon as these signs appear, the work of skimming must begin, even though the milk have only stood 24 hours; and the cream is poured through a hair sieve (which is kept for this purpose, and must never be used to strain up the new milk with) into large barrels, containing about 240 quarts each (usually sufficient for one churning,) in which it remains till the necessary sourness is attained, which in summer follows in 24, in winter seldom under 36 or 48 hours; unless when the small quantity of milk admits of its being partly strained at once into the cream barrel, and the remainder added without skimming from the milk pans when cool. This method, undoubtedly, gives at all seasons the greatest return of butter, but as is generally believed, not of so rich a quality as that produced from cream alone; and, moreover, in a large dairy, dur-

ing the time the cows are in full milk, would occasion much additional trouble, an almost ceaseless churning, and a total prevention of cheese making. The cream having attained its requisite acidity, during the advance to which it must be frequently stirred with a small churn staff to prevent its coagulating, technically called becoming cheesy, the next object of the dairywoman's skill is, the degree of warmth or coolness which must be imparted in order to secure good butter. In warm weather the churn is rinsed with the coldest procurable water, in which a piece of pure ice is often thrown, and sometimes, though more rarely, cold spring water is added to the cream about to be churned, which operation is then always performed either very early in the morning or late in the evening. In cold weather, on the contrary, warm water is applied, both to rinsing the churn and to the cream itself. The churning being completed, the butter is taken off by means of a large wooden ladle, and carried in a tub directly to the butter cellar, where, in a large trough, hollowed out of the trunk of a beech or oak, very smoothly polished off inside, and provided with a plug hole at the lower extremity, (beneath which a small tub is placed to receive the expressed milk,) the butter is slightly worked, and salted with the purest salt, then moulded with the wooden ladle into a mass at the upper end of the trough, and left for some hours to soak and drain. In the evening it is thoroughly kneaded and beat, or rather slapped, the dairy maid repeatedly lifting a piece of from 3 to 4 pounds, and slapping it with force against the trough, so as to beat out all the milky particles; and thus, lump after lump being freed from extraneous matter, the whole mass is spread out, receives its full proportion of salt in all about $\frac{1}{4}$ oz. per pound,) which is worked with the utmost care equally through it, and again moulded into one compact mass. The butter in Holstein is seldom if ever washed, as water is believed not only to rob it of its richness and flavor, but as being itself susceptible of putrefaction, to be equally inimical as milk, to its preservation. When a sufficient quantity is ready to fill a cask, the several churnings are once more kneaded through, a very little fresh salt added and packed into the barrel, which is made of red beech wood, water tight, and previously carefully washed and rubbed inside with salt. Much attention is paid that no interstice shall remain either between the layers of butter or the sides of the cask. A cask is never begun to be filled until it can be completed, as thus alone the butter can be exactly of the same flavor and color, which is probably one reason why small dairies, under whatever management, never produce such good butter as large ones, as the small churnings must remain long exposed to the air, until the requisite quantity is in readiness. The qualities of first rate butter are considered to be, 1st, a fine, even yellow color, neither pale nor orange tinted; 2d, a close, waxy texture, in which extremely minute and perfectly transparent beads of brine are perceptible; but if these drops be either large or in the slightest degree tinged with milk color, it indicates an imperfect working of the butter; while an entirely dry, tallowy appearance, is equally disapproved; 3d, a fresh fragrant perfume, and a sweet kernelly taste; 4th, good butter will, above all, be distinguished by keeping for a considerable time, without acquiring an old or rancid flavor.

The quantity of food which can be afforded to the cows during winter, is ascertained at the beginning of the season, when the harvest returns are known; and in plentiful years the calculation is, that each cow should be allowed 3 sacks of grain, (generally oats of 140 lbs. each sack,) 3900 lbs. of straw, including bedding, and 1800 lbs. of good hay; whilst for every hundred pounds of hay less, she must receive 25 lbs. of grain more, or vice versa.

As during the winter months, when the cows are confined to dry food, the butter loses its fine yellow color, the defect is sought to be remedied by an admixture of coloring matter; and indeed a high color in butter so much regulates its price in some markets (as in Spain and Portugal,) that the export merchant insists on the desirable shade being imparted when it ceases to be natural. The best ingredients for this purpose are found to be, a mixture of annotta and turmeric, in the proportion of 5 oz. of the latter to 1 lb. of the former.

The average quantity of milk obtained here from good stock, may be estimated at from 2000 to 3000 quarts per annum, according to the food and care bestowed on them; the produce of which has been calculated in the following ratio; every 100 lbs. of milk will give $3\frac{1}{2}$ lbs. of butter, 6 lbs. fresh cheese, 14 lbs. butter-milk (exclusive of the water added before and after churning,) and $76\frac{1}{2}$ lbs. of whey; and, though the qualities of individual cows, the nature of their pasture or other food, and the atmospheric changes, occasion an almost endless variety of result, still it may be considered as a fair average that 15 quarts of milk are required for a pound of butter; for although from some cows a pound may be obtained from 12 quarts, yet others and even the same cows, at different seasons and with different food, (such as beets or raw potatoes,) will not produce a pound of butter from less than 17 or 18 quarts. On the whole, it is esteemed a fair return in these duchies when the average produce of the dairy amounts to 100 lbs. of butter and 150 lbs. of cheese per cow. When calves are fattened for the market, so much butter and cheese cannot be expected—from the generally received opinion that fine veal (and the veal of these countries is very fine,) can only be secured by feeding the milk fresh from the cow; they are usually fed for 10 or 12 weeks, and attain the weight of from 120 to 150 lbs. when slaughtered.

BALLOON ADVENTURE AT NIGHT.

From Blackwood's Magazine.

Mr. Holland, a gentleman of scientific habits, projected the enterprise which has strikingly signalized ærostation of our day. On Monday Nov. 7, 1836—at half past one in the afternoon, the balloon rose from Vauxhall Gardens [London] with a moderate breeze from the south-east. It passed over Kent. The weather was singularly fine. At five minutes past four they saw the sea. After passing Canterbury, the course altered towards the north, which would have carried them into the German ocean. The point was now to change the course in the direction of Paris. Ballast was now thrown out, the balloon rose in an upper current, recovered her direction to the south-east, and crossed the Straits of Dover in exactly an hour, about 3000 feet above the level of the sea.

It was fifty minutes past five, consequently the balloon rapidly plunged into the night. The aspect of the world beneath now became curious in the extreme. The whole plane of the earth's surface for leagues round, as far and farther than the eye could distinctly embrace, seemed absolutely teeming with the scattered fires of the population, and exhibited a starry spectacle below, that almost rivalled the lustre of the firmament above. Incessantly, during the early portion of the night, before the inhabitants had retired to rest, large sources of light, exhibiting the presence of some more exclusive community, would appear just looming above the horizon in the direction in which they were advancing, bearing at first no faint resemblance of some vast conflagration. By degrees as they grew higher, this confused mass of illumination would appear to increase in intensity extending over a large portion of the view, and assuming a more distinct appearance, until at length as the balloon passed directly over the spot, it suddenly resolved itself into streets and squares, exhibiting the perfect model of a town, but diminished into curious minuteness by the height from which it was seen. In this manner the aeronauts rapidly traversed a large space of the continent, embracing a vast succession of towns and villages solely distinguished by their nightly illumination. One of those views singularly captivated their attention. They approached a district which seemed actually to blaze with innumerable fires, studding the whole horizon. As they swept along, they saw a central city in the midst of this circle of flame, with every line of its streets marked out by its particular range of illumination. The theatres and other public buildings, the squares, and all the more prominent features of the city, were indicated by the larger accumulations of light. They could even hear the busy murmur of the population—the whole forming an earthly picture of the most striking contrast to the darkness, the serenity, and the silence of the vast region above in which they were moving. This was the city of Liege, whose surrounding iron foundries formed the horizon of flame. This was the last spectacle of the kind which met their eyes. Thenceforth it was all midnight, every sound was hushed, every light died, and all was solemn and awful obscurity. Withdrawn from the earth, which was buried in the profoundest stillness, they looked to the heavens. There was no moon. The hue of the sky was intensely black, but the stars, redoubled in their lustre, shone like sparks of the whitest silver. Occasional flashes of lightning in the north.

In a situation, which it was never in the power of man to describe before, the sketch of night given by Mr. Mason, has all the interest of a new source of ideas. "Nothing," says this clever describer, "could exceed the density of night, which prevailed during this part of the voyage. Not a single terrestrial object could any where be distinguished. An unfathomable abyss of darkness visible seemed to encompass us on every side. And, as we looked forward into its black obscurity in the direction in which we were proceeding, we could scarcely resist the impression that we were cleaving our way through an interminable mass of black marble, in which we were imbedded, and which, solid a few inches before us, seemed to soften as we approached, in order to admit us

further within the precincts of its cold and dusky inclosure. Even the lights, which at times were lowered from the car, instead of dispelling, seemed only to augment the intensity of the surrounding darkness, and as they descended deeper into its frozen bosom, absolutely to meet their way downwards." The cold was at the point of congelation. The oil, the water, and the coffee were completely frozen. Yet the sufferings of the aeronauts were not severe, in consequence of their being entirely exempt from the action of the wind.

While they were thus rushing on with almost whirlwind rapidity through the ocean of darkness, yet almost unconscious of motion, an incident occurred calculated to alarm them in an extraordinary degree. By the discharge of ballast the balloon had suddenly risen to an elevation of about 10,000 feet, (about two miles.) In a few moments after they heard a violent burst from the top of the balloon, followed by a loud rustling of the silk, and all the signs of its having been torn suddenly open. Immediately the car began to toss, as if severed from the ropes, and appeared to be sinking to the earth. A second and a third explosion followed rapidly, evidently giving the voyagers the impression that they were upon the point of being dashed to pieces.

But the alarm was brief. The great machine suddenly recovered its stillness, and all was calm again. The concussions were subsequently accounted for by the stretching of the network on the surface of the balloon, which had become frozen during the night. When the machine suddenly shot up into the higher atmosphere, it swelled, and it was the resistance of the frozen network to this swelling, which produced the successive explosions. The sinking of the car was an illusion, occasioned by the surprise and suddenness of the action. When the network had been relieved, and the balloon was thus suffered to take its proper shape, all was calm and regular once more.

During the darkness they were sometimes perplexed with sounds from either earth or air, so strongly resembling the heaving of waters against some vast line of shore, that they were tempted to think themselves speeding along the shores of the German ocean, or hovering above the Baltic. From this apprehension, however, they were relieved by their recollection that their course was unchanged. At length they saw the day, but saw it under the most novel and interesting circumstances. About six o'clock, after crossing the Rhine, the balloon rose to a considerable elevation, and showed them a gladdening glimpse of the sun. The view was now magnificent; the balloon occupying the centre of a horizon of three thousand miles in diameter and comprising in a single vast view scarcely less than eighty thousand square miles. The country that spread below was a rich, undulating, boundless landscape, with the Rhine dividing it, and losing itself among the vapors that still clung to the hills, or covered the valleys. The ascents and descents of the balloon still more varied the prospect. A rapid descent first hid the sun from their view, and they were wrapped in the night which still shadowed the lower regions of the air. Again they rose within sight of this splendid display: again lost it. And it was not until after they had made the sun rise three times, and set twice, that they could regard day-

light as complete on the mighty expanse below.—They now thought of making their final descent. But the question arose—"where were they?" They saw below them ranges of forest, wide plains, and large spaces covered with snow, giving the rather startling impressions that they had passed the bounds of civilized Europe, and were hovering over the deserts of Poland, or the Steppes of Russia. However, they now resolved upon descending; and after two attempts, baffled by the failure of the wind, and the nature of the ground alighted in safety, at half past six in the morning, in the Grand Duchy of Nassau, and about two leagues from Wellburg. The voyage occupied about eighteen hours, and was in extent about five hundred British miles.

From the Kentucky Farmer.

EXPERIMENTAL CROP OF CORN.

*Bourbon County, near Centerville,
October 5, 1840.*

Dear Sir:—You will be pleased no doubt to learn the result of an experiment made by me in the cultivation of corn. The certificate below, will show the quantity of ground cultivated and the amount of product, and it remains only to describe the character of the soil, and seed, and the mode of cultivation.

The soil was good, but not new. It had been in meadow for many years previous to the last seven. The five first of last seven, it was in hemp: the last but one it was in rye, and the last in seed hemp.

The seed was of a variety well known in this neighborhood, particularly among distillers, who speak of it as yielding more spirits than any other kind. It is yellow, and has a medium ear in size, a firm deep grain, very small red cob, shells easily, and in shelling yields abundantly. For several years past I have been improving it, by a careful selection of seed, and the result has been an increase in the number and size of the ears. It matures about two weeks earlier than other corn commonly does.

In its cultivation I was governed by the principles, that the roots were not to be broken; that a good bed was to be given the roots to occupy; that light and heat should get to them equally, and that the whole power of the soil should be brought into action without being burdened. I first, as soon as it could be done after the frost was out of the soil, gave it a deep ploughing with a Cary plough. In April, just before planting, I spread over the whole surface a thin coat of fresh stable manure in its unfermented state; then cross ploughed with the same plough; then harrowed; then laid off rows two feet apart with a shovel plough; dropped the seed in the bottom of these rows, as near one foot apart as I could; covered with hoes, and in so doing made the surface level, every clod being crushed with the eye of the hoe, and I then pressed the whole down tight with a good roller. When the corn was about one foot high, I had the weeds cut with a sharp hoe by scraping, great care was taken not to break the surface nor to hill the corn. It had but one hoeing of this sort, and the laborer was about one day in doing it.

The manure, though green from the stable, as the season was wet, was of much service, which I suppose would not have been the case, had the season been dry.

In my opinion the experiment proves unequivocally, that in wet or rainy seasons, such as the past has been, a crop of corn may be trebled, and that with a great reduction of labor. What could be done such a year as was that of 1839, remains to be tested. Very respectfully, &c.

GEO. W. WILLIAMS.

Bourbon County, September 24, 1840.

We do certify, That we have this day accurately measured the quantity of corn grown by Geo. W. Williams, as an experiment in the mode of cultivation; that we have also accurately measured the land so cultivated by him, and we find the land contains one acre and one eighth of an acre, and the quantity of corn is one hundred and seventy-eight bushels, making at the rate of one hundred and fifty-eight bushels and two-ninths of a bushel to the acre.

WILL. P. HUME,
GEO. MOORE,
JOSEPH H. CLAY,
R. P. RANKINS,

BUCKWHEAT.

From the Cultivator.

Mr. Haynes of Natick informs us that he has eight acres of his light warm land in buckwheat. He sowed it on the third of July, on the furrow, after once ploughing, and in addition to his buckwheat seed he sowed one bushel of rye to the acre. The rye has come up and is waiting for the buckwheat to be taken off, when it will take its turn. Mr. H. means to let it grow until June, then plough it in and sow buckwheat and rye again—the one for harvesting and the other for a next year's green crop. Mr. Haynes ploughed his land but once. A neighbor of his ploughed similar ground twice, and his crop is not so good as that where the plough went but once.

IRISH POTATOES RAISED FROM SLIPS.

Mr. Cortsett, of Stapleton, near Bristol, has succeeded in raising this valuable root from the cuttings. Mr. C. says, reasoning upon the analogy of the potato to the dahlia, I was induced in the spring to try an experiment on cuttings, and have succeeded admirably, having from white-apple and Fox's seedlings (an early potato) produced a good crop of full sized potatoes, many of which weighed half a pound.

The method was this: when the potatoes were about nine inches high, I cut off the tops about six inches long, planted them in a line about eight inches apart with a flat dibble, pressing the earth carefully against them, gave them water and afterwards hoed them as an ordinary crop. I produced this way at the rate of 140 pounds per rod. —*English paper.*

IRON COTTAGES.

A model of a cottage, entirely constructed of iron, has been exhibited in Glasgow, of an elegant structure, and so well adapted to the purposes designed, that no doubt can be entertained of its fitness for general adoption, as well on the English coast, as in the interior. The model contains six chambers, a kitchen, wash-house, and other conveniences. A cottage constructed according to this model, would cost 250*l.* sterling. A double house, that is, one containing fourteen chambers, would cost 500*l.*, which is not half the cost of a similar one built of common materials. Besides, it could be prepared in the course of two months. The iron trade of a country might gain much by this kind of construction.—*Rec. Soc. Polyt.*

PRESERVING FRUIT FROM LATE FROSTS.

The fruit of trees whose precocious bloom exposes them to the destructive influence of late frosts, may have their flowering retarded by a removal, during the winter, of the earth around the roots; so as to permit the frost to descend deeper, and thus to check the too early ascension of the sap. Many southern horticulturists have resorted to this plan with respect to their almonds, apricots, peaches, &c. In this way the flowering has been retarded more than a fortnight, and late frosts have not attacked them.—*Idem.*

INSPECTIONS OF TOBACCO IN VIRGINIA, TO SEPTEMBER 30.

	1839.		1840.
Petersburg	6616	Petersburg	14123
Richmond	9992	Richmond	20738
Lynchburg	6936	Lynchburg	13613
Farmville	2381	Farmville	4552
Danville	735	Clarksville	2710
Milton	480	Milton	520
Clarksville	1307	Danville	927
Tye River	210	Deans	200
Union } supposed	100	Tye River	500
Deans }		Union	75
	28757 hhds.		57958

REARING HOGS.

From the Farmers' Cabinet.

Mr. Editor.—I wish to add my testimony to that of "Siam," at page 42 of the Cabinet for August: I have never been able to rear the first litter of pigs from a young sow with credit to myself, or profit to any one, and it is now my practice to kill them for roasters, rather than make another attempt. I have, however, seen some who have been more fortunate, but, as a general rule, I believe the thing, as I have stated it, is well established; and in a paper, which I have now before me, "The Carolina Planter," I find the following observation.

"It is a fact of common observation, with even

our old servants who have long been hog-minders, that the first litter of pigs from a young sow, or, as they call them, *gilt pigs*, are naturally of a feeble constitution and unthrifty, and difficult to raise, and even if raised, never perhaps acquire the size and weight that litters of the same sow do afterwards." And, in addition to this, I would say, I have raised more than twenty calves from young cows—their first calves—and have never failed in obtaining them fine, strong and healthy; nay, if I were to double the number, I should not be beyond the truth. Can any of your readers account for a phenomenon that is so generally accredited, as to have grown into a proverb—"the calf of a young cow, the pig of an old sow."

From the Farmers' Cabinet.

BLOSSOM.

The property of Samuel Canby, Esq. of Woodside, Delaware.

Pedigree—Blossom, roan, calved in 1835; bred by C. H. Hall, Esq., of New York: got by Fox's Regent, dam Leonora, (a great and constant milker, imported by Alderman Ferris of New York,) by a son of Lancaster; g. d. out of Elvira, by Young Phenomenon, and he by Favorite. Fox's Regent, (sire of Blossom, bred by C. H. Hall) was got by Imported Regent, dam Snowdrop, got in England by Fitz Favorite, and the first heifer dropped in America, by Blanche, a great milker, presented by Admiral Sir Isaac Coffin to Mr. Hall.

This remarkable animal (remarkable for her *breeding* as for her *milking*) is a beautiful roan, with a countenance the most gentle that can be conceived. Her capacity for deep milking is observable in the peculiar formation of the udder, and prominent milk-vein, her quiet and peaceable disposition tending greatly to the secretion of that flow of milk, which has never ceased since the day of her first calving, which was on the 5th of April, 1838. On the 4th of July she brought twins, *Liberty* and *Independence*, and on the 16th of May, 1840, she had twins the second time! These were named *Romeo* and *Juliet*. Thus has this wonderful animal brought forth five living calves in the space of twenty-five months! Her milk has averaged twenty quarts per day during the whole of this time, and with her first calf she gave twenty-five quarts per day, making nearly twelve pounds of butter per week. Such constant draining has justly been considered unfavorable to health and bodily strength, and for this reason she has never carried much flesh; but it has been impossible to dry her milk, even for a few days before calving, although she has been kept from grass for that purpose: her condition, however, is generally good, and she shows great vigor and sprightliness. She is again in calf, by the imported bull Washington Irving, and her time is calculated for the month of March. Her first calf *Delaware*, took the first premium at the late exhibition of the Delaware State Agricultural Society, held at Wilmington, as "the best animal raised in the country."

But it is a singular circumstance, that her last twins, *Romeo* and *Juliet*, are white, although her own color is roan, and that is also the color of the

bull! This shows that she is breeding back, bringing herself descended from *Comet*, 155 (1,000 guineas), who was white.

Here follows an account of Blossom's yield of milk for one week:

	MORNING.	NOON.	EVENING.	TOTAL.
June 13,	12 quarts	11½	11½	34½
" 14,	12½	11½	11	34½
" 15,	12½	11	11½	35
" 16,	12½	12½	11	36
" 17,	12½	11½	11	35
" 18,	13	12	11½	36½
" 19,	13½	11½	11	36
Total,				247½

Being on an average over thirty-five quarts per day, yielding 13½ lbs. of well-worked butter, one month from the time of her calving.

From the Journal of Commerce.

A KINGDOM EMBANKED FROM THE SEA.

Rotterdam, (Holland,) Sept. 25, 1840.

It certainly strikes an American as very singular that a country—a whole kingdom—should actually be lower than the sea; yet such is the case with Holland. Nothing but the dikes, and sand hills on the coast (called Dunes), keep it from being submerged. Thus every river and creek is followed up in all its wanderings and ramifications, each side carefully diked up—canals, outlets, sluices, dams, and docks placed wherever required, and thus, the whole kingdom is garrisoned as it were, requiring constantly a large body of engineers at every part to watch and guard against the invasion of their subtle enemy (the water) which is unceasingly wearing and washing away the embankments, requiring instant and energetic measures for repairing what injury may be sustained, and preventing their foe from overspreading the country. Much of the land has been reclaimed from the water. The lake of Haarlem, 28 miles in circumference, averaging 6 feet of water and 8 feet mud, the washings of the Rhine, was once land, and they have now commenced draining it, to make it land again, which will take about 6 years. Part of the immense number of windmills seen here, are used for the purpose of drawing off water from the land and pumping it into canals that lead finally into the sea. You can stand on a dike, and see four or more levels of water, all within a few feet of each other. They have few fences, the houses in the country being surrounded by little canals, with bridges, over which are gates which are of course a protection against intruders. Many have small turning bridges, turning on a pivot placed on the house side, so that when you pass over, a small jerk with the foot, places the bridge your side of the canal, and prevents ingress from the opposite bank. In Amsterdam there are from 280 to 300 bridges through the city. It is surrounded by a fosse 80 feet wide, its walls are demolished, but it has 26 bastions, converted into corn mills, and is entered by 8 gates, (*poortjes*). It is built in the form of a half circle on the Y. The Amstel river enters the city, S. E. side, and its waters are then conducted round and through the city, communicating with the Y, which flows into the Zuider Zee. There is a ship canal through

to the sea. The city is about nine miles in circumference. It stands entirely on piles, driven in the mud—has about 27,000 houses, over 200,000 inhabitants, 22,000 of whom are Jews. The Royal Palace is a grand building, 282 feet long, 222 feet deep, 116 feet high, without the Tower, which is 67 feet high. The building stands on 13,695 piles. The view from the Tower is grand beyond description. The city at your feet, the *Zuider Zee*, Lake of Haarlem, shipping, windmills, canals, bridges, trees, houses, town and villages in the distance, presenting at one view, in a few words, a little of every thing.

SIBERIAN LIFE ON THE KOLYMA.

From Wrangel's Survey of the North-East coast of Siberia.

To form a just conception of life on the banks of the Kolyma, one must have spent some time with the inhabitants. One must have seen them in their winter dwellings and in their summer *balagans*; one must have shot down their rapid streams in the light canoe, must have climbed mountains and rocks with them, or dashed in their light dog-drawn sledges through the most piercing cold over the boundless tundra; one must in short have become one of themselves. Such was our life during the three years we spent here. We lived with them, dressed like them, fed on their dried fish, and shared with them the hardships and privations inseparable from the climate, and the frequent want even of food which it brings along with it.

Let us begin with the spring. The fishery forms their most important pursuit; indeed the very existence of the whole population depends upon it. The locality of Nishney-Kolymsk, however, is unfavorable, and the inhabitants are obliged to migrate at this season to more suitable parts of the river. As soon as the winter ceases, they accordingly abandon their dwellings in search of some convenient spot, where they forthwith construct a *balagan*, or light summer hut, and immediately commence their hostilities upon the piscatory tribe. Most of the Nishney-Kolymskites have regular country-houses of this description at the mouths of the several creeks and rivulets, which they begin to visit in April, in order to prepare for the campaign. In the middle of May, when the merchants arrive from the fair of Ostrownoye, on their return to Yakoutsck, the whole population abandons the little place, leaving the whole town to the guardianship of one Cossack sentinel, and perhaps one or two old women, whom age prevents from joining in the general pursuit.

"Spring is the most trying season of the whole year. The store collected during the summer and autumn has usually been consumed for some time; the fish do not always make their appearance immediately, and the dogs, exhausted by their winter work, and yet more by the severe fast to which they have for some time been subjected, are too feeble to allow their masters to avail themselves of the *nast*,* to catch a few elks and wild reindeer. Famine then appears in its most horrible form.

* When the warmth of the spring sun thaws the surface of the snow, it freezes again during the night, whereby a thin crust of ice is formed, strong enough

Crowds of Tungusians and Yukaheers come flocking into the Russian villages in search of some subsistence. Pale and ghost-like, they stagger about and greedily devour every species of garbage that falls in their way. Bones, skins, thongs of leather, every thing in short that the stomach will receive is eagerly converted into food. But small is the relief they find; for the unthrifty townspeople are by this time almost as ill off themselves, and living upon the scanty remnant of fodder stored up for the use of the dogs, so that many of these faithful and valuable animals perish nearly every year of hunger. There is a storehouse established by the government, where rye-flour is sold to every comer; but the expense of conveying it from so enormous a distance enhances the price to such a degree that few are able to avail themselves of the facility thus afforded them. Although the additional accommodation is granted them of not paying before autumn, still there are not many who can afford to give twenty rubles for a pood of flour which moreover has often been damaged during the protracted journey it has had to perform. Three of these periods of horror did I witness, during three succeeding springs, and even now I shudder when I reflect on the scenes of suffering which I beheld, and of which it would be utterly impossible for me to attempt a description.

It is just when famine is at its worst that relief arrives. Suddenly countless swarms of birds make their appearance. Swans, geese, ducks and several descriptions of snipes. These are the first heralds of spring, and at their coming hunger and want are at an end. Old and young, men and women, all that can walk or run, now rush out with guns, bows, and sticks, to kill as many as they may. In June the ice breaks up, a profusion of fish comes crowding into the river, and all hands are in movement to avail themselves of the short season of grace to provide a store for the coming year. But here a new misfortune often assails them. The stream is not strong enough to float away with sufficient rapidity the mighty mass of ice. These accumulate in the narrows and shoals, and the water, arrested in its course, quickly overflows the whole of the low country, and, if the inhabitants are not quick enough in driving their horses to the hills, the poor animals are infallibly lost. In the summer of 1822 we had such an inundation at Nishney-Kolymsk, which came upon us so suddenly that we had only just time to take refuge with a few of our most indispensable articles upon the flat roofs of our huts, where we were forced to remain for upwards of a week. The water rushed with fearful rapidity between the houses, and the whole place looked like a little archipelago of house-tops, among which the inhabitants were merrily rowing about in their canoes, paying one another friendly visits and catching fish.

"More or less these inundations occur every year, and when the water subsides the main fishery with nets begins. Fish form the chief food of man

to bear a sledge with its team of dogs. In this condition the snow is called *nast*, over which the elks and reindeer are pursued during the night, and as, owing to their greater weight, they are constantly breaking through the ice, they are caught by the hunters with little trouble.

and dog, and for the yearly consumption of the hundred families that compose the little community of Nishney-Kolymak, at least three millions of herrings are required. Many other kinds of fish are caught at this time, among which is the *Nelma*, a large description of salmon trout, but the first fish are generally thin, and are mostly converted into *yukhala* for the dogs; that is to say, cut open, cleaned, and dried in the air. From the entrails an abundance of train oil is obtained, which is used for food as well as for fuel. The *yukhala* is distinguished from the *yukhala* merely by the selection of a better kind of fish, and by greater care in the preparation.

"The proper season for bird hunting is when the animals are moulting, when having lost their feathers they are unable to fly. Large detachments are then sent off from the fishing stations, and numbers of swans and geese are killed with guns, bows, and sticks. The produce of this chase is said to have diminished greatly of late years. Formerly it was no unusual thing for the hunters to bring home several thousands of geese in one day, whereas now they are content if they can catch as many during the whole season.

"While the men are fishing and hunting, the women make the best use of the interval of fine weather to collect the scanty harvest which the vegetable kingdom yields them, in the shape of a few berries and aromatic herbs. The gathering in of the berries is a season of gaiety, like the vintage in southern climes. The young women wander about in large parties, spending the nights in the open air, and amusing themselves with song and dance, and other innocent diversions. The berries themselves are preserved by pouring cold water over them, and freezing them, in which condition they form one of the favourite dainties during the winter. Besides the berries, they collect at this time the *makarsha*, a mealy root found in large quantities in the subterranean store-houses of the field-mice. The young girls appear to have a peculiar tact in discovering the magazines of these little notable animals, whom, without the least remorse, they plunder of the fruits of their provident industry."

METHOD FOR RETARDING THE HATCHING OF SILK-WORMS' EGGS IN ICE-HOUSES.

For the Farmers' Register.

The following plan for retarding the hatching of silk-worms' eggs by ice-houses, for successive crops, I have found more successful than any hitherto adopted,* and it is now communicated for publication in the Farmers' Register, for the use of such persons as design making further experiments on the subject. I do not claim originality for the plan in all its features, because it is only a modification of that successfully practised by the Rev. D. V. McLean, of New Jersey, in 1839.

A box is made of strong inch-plank, 15 inches

deep, 20 inches long and 20 inches broad. To the bottom of this a *bottomless* box, made of similar plank, 8 inches deep, 9 inches long and 9 inches broad, is nailed. The vacuum between the large and small box is filled with pulverized charcoal, which is confined by nailing pieces of plank to the edges of the small box, and sides of the large one. The eggs are then rolled up in separate packages, of about an ounce each, (always placing a blank sheet over the eggs,) and 5 or 6 of these packages are placed in a square tin canister, of dimensions that will allow its being placed in the small wooden box without difficulty, and in height corresponding with the small wooden box. The top of the canister is then put on in a loose manner, so as not to exclude the air, similar to the plan adopted by retail grocers with their tea-canisters, and it is then placed in the small wooden box. The top is then nailed on the large box, and it is placed in the ice-house, so that the ice will come within three inches of the top. Two holes are bored with a spike gimblet about two inches below the top of the box. The boxes are examined (but not opened) from time to time, that they may be placed in their original position, which will be changed by the melting of the ice.

By this method I retarded the eggs last season, from the 20th of April until the 4th of July, or 74 days after the natural period of hatching.* I have endeavored to describe the plan accurately, because I believe that careless management may lead to disappointment and loss.

The boxes must not be opened until the eggs are wanted for hatching, and when once opened the eggs must not be left in the ice-house. The practice of placing large parcels of eggs in a box which is frequently opened in the ice-house is dangerous, and I think has produced many of the failures of the last season.

The eggs of silk-worms, and also of other insects, that will not hatch under ordinary circumstances, until the spring or summer of the following year, pass through a *hibernate* or winter state, and during this period the embryo is *dormant*, quiescent or inactive. If this be not the case, how shall we account for the well known fact, that the vitality of the eggs will be destroyed by subjecting them to a very low temperature after very warm weather in the spring, when eggs of the same kind in all other respects, if placed in the ice-house between the 1st and 10th of February, have hatched well as late as the 4th of July, and even as late as August, and produced healthy worms.

By frequently opening the boxes and introducing the warm air, this state of inaction of the embryo may be disturbed, and, when disturbed, attempts to retard its progress, *unnaturally*, will either destroy vitality, or if the worms emerge from the eggs they will drag out a feeble existence, and nearly all die before they are ready to form cocoons. It is well known to all persons familiar with the hatching of silk-worms' eggs, that a *gra-*

* In boxes similar to those described I have retarded the eggs, by burying them under ground until the middle of June. These eggs hatched well and produced very healthy worms. But before a minute description of this method is published, I wish to subject it to the test of further experiments.

* These eggs were placed in the ice-house on the 10th of February, but the 1st of February is full late, and if delayed much beyond that period, it may be found impracticable to retard the hatching without injury to the eggs. The natural period for hatching in latitude 38°, was the 20th of April. This was proved by leaving eggs exposed during the whole of the preceding winter.

dual change takes place a few days before the worms make their appearance, which is manifested by changes in the color of the eggs.

The use of charcoal I consider very important. It absorbs the water proceeding from the melting ice, and also prevents either a sudden rise or fall of temperature. For this opinion we have scientific authority of high respectability.

"Charcoal by long exposure to the atmosphere absorbs one-twentieth of its weight, three-fourths of which are water." * * *

"Charcoal is a very slow conductor of caloric. The experiments of Guyton have determined that caloric is conveyed through charcoal more slowly than through sand, in the proportion of three to two. Hence powdered charcoal may be advantageously employed, to surround substances which are to be kept cool in a warm atmosphere; and also to confine the caloric of heated bodies."—(Henry's *Elements of Chemistry*, vol. i., p. 275.)

My experience accords substantially with these views. When charcoal has been used the papers containing the eggs have uniformly come out dry, but when dispensed with, they have as uniformly come out damp, and in some instances even wet.

LAYTON Y. ATKINS.

Stafford Co., Va., November, 1840.

P. S. The space between the top of the large box and the canister containing the eggs is not filled with charcoal or any other substance, but is left empty, in order that a gradual renewal of the air may take place.

KENTUCKY BLUE-GRASS.

To the Editor of the Farmers' Register.

Frankfort, Ky., Oct. 22, 1840.

Dear Sir:—I observed the inquiry of "a Farmer" in your September number, in reference to Kentucky blue-grass, and your request for information from Judge Kennedy, of Tennessee, or myself. You are perfectly correct, in supposing that Kentucky blue-grass is not the same grass known by the same name in Virginia. I have heard many Virginians denounce, like yourself, the blue-grass of your state, as an abominable pest of the corn-field. I have no personal acquaintance with the plant. A native of the Old Dominion had the goodness to bring out a box of it for me, but it never came to hand. Perhaps I ought to be thankful, and probably you will congratulate me, on the failure of the conveyance. Another Virginian threatened, if it arrived, to have me indicted for the introduction of a horrible nuisance.

The blue-grass of Kentucky, which is the predominant grass of our unrivalled pastures, is the *poa pratensis* of botanists; not the *poa compressa* described in England by the popular name of blue-grass. Our blue-grass has many synonyms—green-sward, spear-grass, June-grass, yard-grass, great or smooth stalked meadow grass, &c.

The following description is from the Gardener's Dictionary:

"*Poa pratensis*—smooth stalked or great meadow-grass—panicle diffused, spikelets four flowered, glumes lanceolate, five nerved, connected by a villus, stipule abbreviated, blunt; root perennial,

creeping by runners, easily penetrating into the earth and crevices of walls. Culm upright, smooth, scarce perceptibly striated, a foot or eighteen inches [in Kentucky often three feet] in height. Leaves smooth, of a dark green color, sometimes glaucous or bluish, heeled, bluntish, spreading. Sheathes, the length of the leaves, striated, smooth. Stipulas, short, blunt. Panicle elongated, upright, very much branched, rugged; branches alternately decoumpounded, when in flower spreading horizontally. Spikelets smaller than those of the *poa compressa*, oval, four flowered, often five, sometimes only two flowered, flattened on each side, green or sometimes purple. Calycine glumes sharp, rugged on the back, a little unequal, three nerved. Florets bluntish, five nerved, scarious at the tip, rugged on the back, connected at the base by numerous very long complicated villous hairs, the inner valves somewhat pubescent at the edge. Filaments longer than the glumes, anthers forked at each end. Styles branched to the bottom. Nectary, two little glumes at the base of the germ; seed angular pointed."

You will be able to judge, from this description, whether the resemblance of the two grasses extends beyond that of their popular names. It is certainly a very great inconvenience that the popular nomenclature of the grasses is so confused and contradictory; and he who shall write a botanic description of them, appending all the popular names given to each species, in such a manner as to enable the reader to distinguish them readily, will have performed a very useful and acceptable service to the agricultural community.

I cannot venture to say whether it would be advisable to sow blue-grass on your marled lands, with the view of smothering or destroying that great pest, wire grass. I can only offer conjectural opinions. It delights in calcareous soils; and I am not confident that sowing it on silicious soils would not prove an utter failure. I am informed of only two experiments made with it in the silicious soils of Kentucky, outside the great limestone region. One of them, in the eastern part of the state, was a sad failure, the grass refusing to form a close turf and only showing itself in occasional tussocks or tufts. The other, in the southeastern part of the state, was reported as highly successful, but although the accounts represented the soil as wholly silicious and did not state the presence of lime. I cannot but believe it contained some portion of calcareous earth. I have no reasonable grounds of doubt that, on your thoroughly marled lands, Kentucky blue-grass would succeed well. But the entire success of the experiment, I imagine, would depend, in no small degree, on the thorough spreading and incorporation of the marl or other calcareous matter employed. Otherwise, I should fear the grass would not form an entire covering of close turf. In our pastures, blue-grass extirpates wire grass, and, indeed, ultimately expels every other plant, and maintains the occupancy. I know nothing that can maintain a long and vigorous existence with it, except iron-weeds or devil's bit, a tall weed which infests our pastures, and which probably some of our farmers would be willing to swop even for your blue-grass.

I am favored with a letter from a Virginia friend, for the last ten years a resident and practical farmer in Kentucky, no less distinguished by his

knowledge and love of agricultural subjects than his literary eminence; from which I will give an extract, more satisfactory, probably, than any thing I could say. From his long residence in both states, his opinions are entitled to much weight; and they favor the conclusion that our blue-grass may be successfully cultivated in Virginia.

"Blue-grass, so called in Virginia, is not the grass called blue-grass in Kentucky. The Kentucky blue-grass is well known in Virginia as the *yard grass* or *greensward*. Its root caespitose, its flower stalk erect like the wheat stalk, its leaves really green. The Virginia blue-grass has a system of hard wiry roots, its stalks recumbent and bent at the joints or internodes, and woody, tough and elastic, and its color is cerulean, or blue. Both belong to the *poa* genus. Almost every gentleman's yard in old Virginia is set with what is called Kentucky blue-grass. The greensward, yard grass, or Kentucky blue-grass, will grow on any rich loam, but delights in a rich calcareous aluminous soil. It will grow well on marled lands of aluminous earth made rich with vegetable matter of any kind except the leaves of the more astringent vegetables, such as the oak, &c. The decayed leaves of the black walnut and black locust are its favorite food. Hence it grows well even in the shade of these trees. Lands made sufficiently rich to produce these trees planted in them, and marled and sown with the seeds of the green-sward, will in a few years exhibit the appearance of Kentucky woodland pastures, allowance being made for the difference in fertility."

If it be deemed important or desirable to introduce a system of permanent pasturage in old Virginia, and if it shall be demonstrated that marling will render your lands capable of producing Kentucky blue-grass in perfection, and at the same time so compact as to bear the hoof, you will have rendered an *additional* service to your state and country, by the publication of the 'Essay on Calcareous Manures,' scarcely less important than Townsend did to England by the introduction of the turnip. Blue-grass here bears somewhat the same relation to a thrifty and profitable economy, and the improvement of the soil, that roots do to the system of improvement and profit in other countries.

I have said nothing upon the modes of setting lands in blue-grass and of pasturing them, as I do not understand your inquiries to extend to those subjects. If, however, such information, (or any other in reference to our rural practice,) shall be deemed useful to the readers of the Farmers' Register, it will give me pleasure to communicate promptly, on request, any in my possession.

Your correspondent, having never seen a blue-grass pasture, well set, has a great enjoyment in the future. The sight of one of our glorious pastures is a thousand times better worth a journey to see than the Natural Bridge of your state. I should be glad to see more Virginians visiting among us; and would indeed be peculiarly happy to accompany Mr. Ruffin in a delightful round to the farms of our principal graziers—"fine old English gentlemen"—who would be equally glad to see him. Very truly,

THO. B. STEVENSON.

We are not less gratified with the contents of the foregoing communication, than thankful to the

writer for his having so promptly responded to our call on this subject, in No. 9. We shall be still further gratified, and some of our readers benefited, by an additional communication, on the best mode of setting land in Kentucky "blue-grass," or what we have known as green-sward. On not only that, but on any agricultural subject, we shall always be glad to be indebted to the pen of our present correspondent. And we cannot but be surprised, that he should have had the slightest doubt (as expressed in his private postscript,) of such aid from him being desirable and valuable. As a reader of the Farmers' Register, he has known our earnest and often expressed solicitude to obtain articles conveying practical information, from every authentic source, no matter how humble the qualifications of the pensman; and he, as the late editor of the Franklin Farmer, one of the best conducted agricultural journals of the United States, had reason to know, by our selections, the value we attached to his writings and to his editorial judgment.

There is no doubt but that the valuable grass which he describes *will* grow well on our marled lands, even when the soil is so silicious as to deserve the term of *sandy loam*; and on which not a trace of this grass could have been found, or induced to grow, before marling. We have never known the seed to be sown, (or any to be offered for sale in Virginia,) and, except in old yards and garden grass-plots, have never known green-sward to have complete possession of the land. But wherever we have marled, even on very poor land, this grass soon began to stand in small spots of a few feet, or at most but a few yards across; and in so many places as to oppose considerable difficulty to tillage; though not to compare with the wire-grass (the English couch-grass,) of which marl still more favors the growth on dry, sandy soils, and the Virginian blue-grass on clay and moist soils. The green-sward, when forming a close sod, of unmixed growth, would not be difficult to plough under—if desirable to destroy such valuable pasture—but when in small tussocks, it is pushed forward or aside by the plough, instead of being subverted, and is therefore more difficult to be managed under a tillage crop.

We trust that some of our several readers, who possess enough botanical knowledge for the purpose, will contribute to effect the object suggested by Mr. Stevenson in regard to the forming a convenient and correct nomenclature of American grasses, so as to get rid of the intolerable confusion which exists, in consequence of different vulgar or provincial names being in many cases used for the same grass—in other cases, the same name being used for different grasses—and

in others, the common name of a well known grass of one region being given to a different grass in another region. What is wanting, is not only to give the botanical name and character and scientific description of each grass, but also a description suited to those persons who have no botanical knowledge—and a list of all the vulgar names known, and their several localities. The preparation of such a descriptive list of grasses, or even the furnishing of any materials for such a one, will be a valuable aid to agricultural improvement.

QUESTIONS AND SUGGESTIONS.

For the Farmers' Register.

"Gentlemen, we have met according to notice, and I hope we can all take time to have a chat on farming. But before we begin, I will tell you that I am a very inquisitive fellow and may hurt some of your feelings; but as my object is improvement, I hope none of you will take insult until your works have been weighed in the balance.

"Mr. A., where do you live, and what do you follow?"

"I reside near James River, in the neighborhood of a mill, where I can always get the best price for wheat. My ground, although of medium quality, is well adapted to this grain; and the carriage costing me but little, I make it my principal crop, and find it profitable. I have four or five fields, and crop each in rotation, by which method I am enabled to go ahead with but little manure; indeed, as I keep but few cattle, I can make but little manure."

"Permit me to ask, if your cross fences are not very expensive, and if bushes, briars and weeds do not pester you?"

"I answer all in the affirmative; but what better can I do?"

"One more question, and I am done with you for the present. What think you of only three fields, thus extending the space for the action of the plough, spreading manure and harvesting from the greater and better portions, and turning under a green crop of oats, rye, peas, Indian corn, buckwheat, or the like, on that which is poor?"

"I must confess this looks more like pulverizing the ground, destroying the pests and bringing my fields to uniformity of character."

"Mr. B., where is your residence, and what your occupation?"

"I live in the big mountains, about sixty miles from market, and make wheat and tobacco for sale."

"How much does it cost you to get your crops to market?"

"I do not exactly know, but when the purchaser and carrier are done with me, I have but little left."

"By keeping your steep grounds in constant cultivation, does it not wash into gullies?"

"What is that to you?"

"Mr. C., where is your residence and what your business?"

"I am neighbor to Mr. B., and raise and fatten stock for market."

"What does it cost you to carry to market?"

"Not much; for as we all start on foot and in good plight, we have no shattering and breaking down on the way."

"Are your lands improving?"

"Yes, they are nearly as rich as heart could wish."

"May I ask you a few more questions?"

"O yes, just as many as you please."

"Then as you are so affable I will only ask you one, which may answer all my purpose—how do you manage your domestic matters?"

"I have an extensive mountain field, on which my sheep graze about eight months, and my cattle about six months in the year. My bottom lands are cultivated in Indian corn, rye, root vegetables and hay meadow. My hills are appropriated to rye, oats and grazing grass. Through the winter my cattle are secured in a neat yard, for making manure; and my sheep run on the grass and rye. I have only two fields on my bottoms from which I harvest grain, these being in corn and rye alternately. The partition of these fields is immediately at the cow yard and horse stable; so that the manure is moved with the least possible expense and damage. One field is manured and planted in corn, at the last working of which rye is sown, and the next year the other is managed in the same way. When the rye is harvested from the first mentioned, it is immediately ploughed again and resowed with rye; the remains of which are turned under in spring in preparation for corn; thus in two years I take from either field a crop of corn, a crop of rye, and have good grazing both winters. By means of canals and conduits, I water my corn and rye as required, in the months of August and September; and from sufficient experience, I know, that although corn will not bear much water when young, yet when beginning to silk and tassel, and afterward, it cannot easily be saturated, nor indeed can young rye; nevertheless it is best, particularly on clay, to divert the water at intervals, so the earth and roots may take breath."

"Mr. D., what is your occupation, and where do you live?"

"I will tell you when I get a drink of grog." (exit.)

"Gentlemen, can one of you tell me who this Mr. D. is?"

"He is a good kind of a good for nothing creature, who makes a business of lurking about the grog-shops, thus spending his money, and time, while his wife and children are suffering."

"Mr. E., I am happy in making you known to this company as a scientific and industrious farmer; be so obliging as to give us a full history of your works?"

"I did not come here for the purpose of making communications; my neighbors call me Klyogg, and like him I intend to live and die."

"But do you not know that for his selfishness, the great Klyogg died heavily laden with contempt?"

"Mr. F., give us a history of your affairs?"

"With cheerfulness I will, particularly for the edification of Mr. E. *****"

"Mr. G., where do you reside, and how do you manage?"

"I am located in middle Virginia, and have abundant space for operations. I keep more horses than laborers, and my ploughs never stop except

for wet weather and ice. I hire only at harvest, and gather abundance. By much ploughing I have no need of either grubbing hoe or weeding hoe. My fences are substantial, consequently my crops are safe. The poorer my ground, the deeper I ploughed, and although the consequence was neither as sudden nor wonderful as calling Lazarus from the grave, yet it was equally certain. I keep only a few milch cows and hogs, and sheep for my own purpose."

"I am informed, Mr. G., that your neighbors are in the habit of calling you Sweepstakes; please tell us why so?"

"I dare not say I know the reason; and if I did, it would be improper in me to tell it."

"Mr. H., I know that your residence is in the limestone valley, therefore please tell us something of your operations?"

"Our lands are generally equally well adapted to wheat, rye, oats, red-clover and all other common grasses. We do not make very much Indian corn, nor is our soil and climate so well adapted to this grain as the eastern side of the Blue Ridge; but the quality of all our grains is superior. We raise some stock for market, and every kind appears to thrive equally well. We have meadows yielding from one to four tons of hay to the acre, which are generally watered, and otherwise pretty well managed. We have vast beds of marl, which when cultivated yield astonishing crops, which is sufficient evidence of their virtue; but so far as I am informed no one has removed and spread any as a manure. We are a healthy, hardy, industrious people, and manage our matters to suit ourselves."

"Mr. J., I am glad to see you here too, please tell us how your matters come on?"

"O yes, I am here too, but as to your disquisitions and book farming matters, I don't believe in them."

"Mr. K., please give us a short sketch before we part?"

"I live in the broom-straw country, and can tell you about its management. The Yankees say it only grows in exhausted fields; but in old Virginia it is not so. It is true that the sedge grows only on poor grounds, but it is found on mountains and valleys, both new and old. On rich ground, I have seen the broom five to six feet high, and so stout that four able horses in a plough could not turn it under. It is a great pest amongst my artificial grasses, but when once I get a good sod of natural grass, I defy it. I once destroyed this pest in a pasture field by running a coulter through it in the fall and winter. When a broom field is about to be brought into cultivation, it is best to fallow and harrow in a crop of rye or oats; the year after, the sod will be rotten and ready for any other crop."

"Gentlemen, bed time has come, and we must part; if ever we meet again, I hope we shall be more advanced in our business; but if you think this (our first effort) is worthless, I shall call a meeting no more."

INVESTIGATOR.

November, 1840.

COTTON IN INDIA.

From the American Farmer.

We again call attention to the importance of the movement now making by several powerful interests in England, to secure a rivalry to our great staple in the market of that kingdom, and, as before remarked, we feel satisfied, from the vastness of the interests involved, and the jealousy that exists towards the institutions of our country, that every means will be put in requisition to secure the accomplishment of the object in view. The operating interests involved in the experiment may be classed under three heads, either of which, in their separate capacity, might be considered formidable. They are—

1st.—The interest of the government of Great Britain to secure a supply of cotton for their extensive manufactories, in case of a rupture with this country.

2d.—The interest of the powerful East India Company, to increase their commercial gains, already enormously great, and to add to the value of their possessions in that vast region, now under their almost unlimited control. And,

3dly.—The influence of the abolitionists in England, to gratify their antipathy to the slaveholding interests of these states.

The mere enumeration of these powerful interests are sufficient to induce the conviction that a most strenuous exertion will be made, and if talent, zeal, and money will accomplish the object, there is no doubt it will be obtained.

With regard to the 1st division of the subject, we would remark,—that the government of Great Britain has ever maintained a jealousy toward commercial nations. England prides herself on the idea of being the mistress of the ocean, and she guards those interests connected with her trade and commerce with unceasing vigilance. She never loses sight of advantages to be gained therein, knowing as she does that her prosperity is vitally identified with her commerce. The United States is, or bids fair to be her greatest rival, and in the course of time it is not to be expected that collisions will not take place between two powers, each contending for the supremacy, each jealous of their honor, and each confident in their might. Under such circumstances, England feels herself hampered by her dependence upon us for our main staple, so necessary at this time to keep her spindles in operation; but her history and all experience teaches, that she will not remain in this state of dependence longer than she can find a way for her escape therefrom; consequently every inducement may be naturally expected and held out by her in releasing herself from her present position—for, disguise it as she will, she is in a measure in commercial bondage to this country, which will, so long as it lasts, cause her to be wary in provoking a controversy with us, except in the utmost resort.

2dly.—The overgrown power and possessions of the East India Company will naturally induce them to desire to extend their trade and resources; and there has sprung up a rivalry in England by the establishment of a new company, having this very object in view, which will induce them to use their vast resources and illimitable means, to accomplish (if the thing is attainable) the great

point now aimed at. The N. Y. Journal of Commerce gives an abstract from and makes some remarks upon the report made to the East India Company on this subject, from which we extract the following, and leave this branch of the subject :—

"The special report of the directors of the Chamber goes on to state that "it appears to be a very judicious arrangement which the Hon. East India Company has adopted, viz: to send over to India, with the machines, several talented and experienced gentlemen, natives of the United States of America, and brought up as cotton planters, who will be able to give a new impulse to the growth of cotton in India, and to devise and carry into effect the best methods of driving the saw-gin, and applying that machine to the very important purpose of cleaning the cotton so produced."

"The vital importance of the American saw-gins will be seen at once when you remember that with one of these machines 1160 lbs. to 1200 lbs. weight of clean cotton can be produced per day, whilst the machine used in India, the Chinka, can only prepare from 33 lbs. to 40 lbs. per day. The machine, also, that has been invented by Messrs. Fawcett & Co. is stated to be even a decided improvement upon the American saw-gin, so that every opportunity is now given to the growers of cotton in India, to compete with the American market. The planters who have been engaged from the United States are so engaged for five years, and their experiments are to be carried out on a most extensive scale. There can be no doubt that with such a wealthy body as the Lords of Leadenhall street—the East India Company—to back and support them through all their endeavors, something will now be done."

3dly.—The influence and zeal which the abolitionists of England have evinced, are too well known—the British West India colonies are a proof before our eyes of the fact—and it is equally well understood, (for their movements have been open and above board) that they are determined to take the peculiar interests of our southern states into their especial care and keeping. We will not at this time extend our remarks upon this branch of the subject, farther than to introduce some from the journal above quoted, which comprises the pith and marrow of all that is necessary to be said thereon, and which we especially commend to our southern friends :—

"Bearing upon this subject, though partially, is the meeting held on the 27th at Manchester for establishing "The Northern Central British India Society." The celebrated Mr. George Thompson has been instrumental in getting up the steam on this occasion, and "Charles Lennox Redmond, a gentleman of color, Anti-slavery debater from Pennsylvania," was paraded upon the platform. The chairman declared that the object of the meeting was to aim a deadly blow at slavery, and to transfer our market from the slave grower of cotton in America, to the free grower of British India. The principal speakers were Mr. Thompson and Mr. O'Connell, and the latter came from Ireland expressly to attend the meeting. Mr. Thompson declared that there was no measure so calculated to effect the downfall of slavery in the United States, as by encouraging the growth of cotton by free labor. He instanced the superior cheapness of free labor over slave labor by the cultivation of indigo. Fifty years ago it was wholly supplied by slave labor, but now the slave grown indigo of the Carolinas and South America, has been superseded, and the three millions of it which they imported into Europe has dwindled beneath an ounce.

In allusion to the part taken by the East India Company, which I have above described, Mr. T. declared

that it was an event in history that could not be matched for 200 years. Mr. O'Connell's speech was particularly remarkable, for it did not contain one single sentence of abuse against the south. It was confined entirely to a description of the atrocious tyranny exercised over India by the Company, and demonstrating the miseries, privations, famines, and death, which have been the melancholy consequences of their iron rule."

COMPETITION OF EAST INDIA COTTON WITH AMERICAN COTTON.

[From the Boston Daily Advertiser.

The increasing magnitude of the trade between India and Great Britain, and its importance to the latter country as a great and growing market for her manufactures, is a subject of discussion which has become very interesting to the British nation, as it also should be to us, for its bearing on the future demand and value for our great staple—cotton. The ground taken by many intelligent persons in India and in England, who have taken great pains to become acquainted with all the facts in the case, is that the natural capabilities of British India for the production of raw cotton will enable her planters and merchants to supply the consumption of England lower than the produce of any other country.

In accordance with this view of the matter, exertions have been made to extend the cultivation and improve the qualities of the India product by cotton importations of seed from this country and all other growing countries, and by inducing planters of experience and skill in the management of its cultivation, to go from this country to various parts of India, where some of them have arrived, and are now engaged in that object.

To aid in these designs—of the Indian Government and Indian planters—the merchants and manufacturers in Great Britain have held various meetings and formed associations, and the reports of their proceedings have been published in the leading journals of England with great commendation of the zeal and enterprise of those concerned in this important undertaking, and for the most part participating in the sanguine expectations of the East Indians, in the opinion set forth by them of their ability to "render it"—to use their own terms—"unnecessary for England to have recourse to America or to any other foreign market, for the supply of cotton which she needs."

If England expects to receive her whole supply of cotton from India there must be a rapid and great extension of its cultivation in that quarter. The import of cotton into Great Britain for several years is as follows :

	From U. S. POUNDS.	From E. Indies. POUNDS.	From all parts. POUNDS.
1835	283,000,000	44,000,000	369,000,000
1836	281,000,000	79,600,000	404,000,000
1837	314,000,000	52,000,000	403,000,000
1838	417,000,000	38,000,000	497,000,000
1839	304,500,000	47,000,000	398,000,000

The export of cotton of this year's crop to Great Britain, amounts to 1,209,000 bales and before the season closes it may reach 1,240,000 bales, of 375 lbs., equal to 465,000,000 lbs.

The imports of Indian cotton into England will be larger than last year, owing principally to the interruption of the cotton trade between that coun-

try and China. Usually India sends to China about 50 or 60,000,000 lbs.; a portion of this will no doubt go to England, superadded to what would otherwise be sent there—perhaps 60,000,000 lbs.

If then we take the aggregate importation of American and East India cottons into Great Britain for six years, they will amount to 2,064,500,000 lbs. of the former, against 320,500,000 of the latter. The average for six years of the East India will be 15½ per cent. on the American. A quantity not more than equal to the consumption of the factories in Massachusetts, Rhode Island and Maine.

The question as to which country can produce this staple at the lowest price, is a very important one to these states. Thus far the facts and the inferences which may be reasonably drawn from them, are in our favor, as will be apparent by the following statements.

The largest importation of India cotton into England took place in 1818, under the stimulus of extreme prices which ranged through the years of 1817 and 1818 in the Liverpool market, 8d. to 16d. per pound equal to 16 and 32 cents per lb. for Surat and Bengal; and for American Uplands 16d. to 22d. equal to 32 and 44 cents per lb.

The imports from India to Great Britain in 1817 amounted to 117,252 bales—increased in 1819 to 242,090 bales, of 300 lbs. each, equal to 72,637,000 lbs.—against an importation in Great Britain from the United States of 216,500 bales of 240 lbs. as rated in England. Thus it would appear that in 1818 the quantity of East India cotton imported into England was 72,627,000 lbs., against 51,965,000 from the United States. The whole imports of cotton in Great Britain in 1818 amounted to 173,940,000 lbs., of which were consumed 111,800,000 lbs.—a quantity, probably, somewhat above the existing consumption of the United States, while that of Great Britain extended to 401,975,121, the average of 1838 and 1839, and it may somewhat exceed these figures the current year.

When prices of this staple fell, as they did in a great ratio after 1818, the imports from India rapidly declined, and one year below 20,000 bales, while the imports from the United States, though equally reduced in value, continued to increase. In 1818 the imports of East India cotton to Great Britain were 40 per cent. larger than from the United States. This year the probable quantity of East India imported in Great Britain will be about one eighth of the quantity imported from the United States. On the India importations there will be a loss at the existing prices of at least 30 or 40 per cent. to the importers though shipped at as low or lower prices than have usually been paid for it, while the shipments from this country, it is said by those who are concerned in them, will afford a saving remittance.

These facts will, we think, support the inference to which I referred—namely, that we can undersell the East India cotton grower in the English market; for while their shipments to England have declined, ours have increased in the period of 21 years from 52 millions to 465,000,000 lbs. We have, too, gained in about an equal ratio upon the Brazils, Egypt and West Indies, our other competitors in the production of this staple. In Egypt and the Brazils the crops have decreased the last 20 years while our crops have increased from 138,900,000—the out-turn of the two seasons of

1820 and 1821—to upwards of 900,000,000 lbs. the product of the season now drawing to a close.

But it may be said that the existing low prices are not remunerative to the planter, and consequently the crops will be curtailed. This was the ground taken in the Cotton Circular that appeared some twelve months since, under the signatures of Mr. McDuffie, Mr. Branch, and other cotton planters. They even complained of insufficient prices and of combinations among merchants and manufacturers to keep them down when the crop had been nearly sold at 12 to 16 cents per lb. The crop of this season has not, we suppose, averaged over 8 cents per lb., and yet the cultivation has not been lessened; nor can any intelligent person familiar with the condition of the cotton states, point out a more profitable employment for lands, labor and capital, than the production of cotton at 8 cents per lb. So far from there having been any reduction of planting, the common opinion is, that a season as favorable as was the last, will yield some 100 or 200,000 bales beyond the crop of 1839–1840, amounting to about 2,140 or 2,150,000 bales. It is not, however, to be expected that the season of growth and for securing the crop will be so extremely favorable as the last, and the most general anticipation at this early day is, that the coming crop will fall short of the last by 2 or 300,000 bales, and if such be the case, taking into view the increased consumption and somewhat decreased stock in Europe—it is thought by many experienced merchants and planters, that the prices of this commodity will range somewhat higher in 1841, than they now are or have been during the current year, provided the peace of the world, and the operations of the manufacturer and merchant shall not be discouraged nor disturbed by wars or the apprehensions of wars. Such a state of things would greatly reduce the consumption of cotton and all other staples of which we have an exportable surplus.

On the whole, though there may be some cause for anxiety as to the interference of India with American cotton, yet we are strongly inclined to a contrary opinion, grounded on some considerable experience as to the results of the experiments in India.

It is an interesting subject to the whole country, and especially to our southern friends, whose free trade principles would not allow them to throw any impediments in the way of the northern manufacturers, should they turn away from their staple to that of India. At present they regard us as unimportant customers—and so we are in comparison with the whole of Europe; but they should bear in mind that New England alone now consumes more than half as much cotton as the whole consumption of England, Scotland and Ireland, 20 years ago: and that, according to the ratio at which consumption has proceeded the last 10 or 12 years, it will be doubled in the course of that period.—The consumption of the whole country may now be 275,000 bales, and in 1852 it will fully reach 500,000. This is predicted chiefly on our home consumption, as we only export about 3 to 4,000,000 of manufactured goods.

If, however, the currency can be kept in a sound state, and commerce and manufacturing remain undisturbed by an inflated currency—necessarily tending to over importations and commercial revulsions—we shall be able to manufac-

ture coarse goods as low, and for some articles lower than in England, and consequently our exports of cotton fabrics may and no doubt will be extended to three or four times their present amount. It is indeed as certain that our natural capabilities, when brought into full action, (which they have not as yet been) to produce heavy coarse cotton fabrics, are as competent to supply this country with nine-tenths of all we want to consume, as they are to transport the products of the country at a lower rate than our European competitors, and this too under any duty which government may think it expedient to impose for the purpose of revenue.

It is equally certain, that in many sorts of coarse goods we can compete successfully in the markets of South America, Asia, and Africa, and in some parts of Europe, with our only rivals the manufacturers of Great Britain. Our failing to do this to a greater, much greater extent than had heretofore been done, is owing to the injurious workings of a vicious currency, and still worse system of managing it, together with that want of accuracy, skill and prudence, which are characteristics of the majority of those concerned in manufacturing. These, however, are, for the most part, evils of a temporary character, and can be and will be overcome, and before this century closes New England may not be far behind Old England in her most important branch of manufacturing.

In regard to the more immediate object of these remarks, namely, the competition of India, with the United States, for the supply of cotton to the English markets, I would refer the reader to an interesting and well written article, in "*Hazard's United States Commercial and Statistical Register*," vol. i., p. 109. It contains the remarks of an able, intelligent writer, under the signature of B., upon a communication in an English Journal—in which latter paper it is contended that India cotton can be so improved in quality and lowered in cost as to undersell the American. The commentator, who appears to be acquainted with his subject, contends to the contrary, and though we think he has reasoned in some respects upon wrong data, yet we concur in the conclusion to which he has arrived.

The work to which we have referred is devoted mainly to statistics. It contains many facts which ought to be familiar to every merchant, mechanic and manufacturer in the country, as having a useful bearing on their pursuits. It will also be a useful book of reference to the legislator and politician, most of whom lessen the benefit of their labors for want of facts. It is, I believe, the only journal in the country devoted to this useful, but, among us, much neglected branch of science, and it merits encouragement.

INVESTIGATOR.

COTTON TRADE.

From the N. Y. Herald.

The cotton year has closed, after a season of great abundance. The following is a statement of the cotton crop for the year ending September 30, 1840.

Cotton crop of the United States, 1839-40.			
New Orleans Sept. 26,		960,850	
Less received from Mobile and Florida,		18,378—942,174	
Natchez on export to Liverpool and New York,		8,931	
Mobile,		446,678	
Florida,		128,344	
Georgia, September 30,		295,156	
Add export from Darien to New York,		11,070—295,708	
South Carolina, September, 30,		318,870	
Less receipts from Georgia and Florida,		7,132—311,738	
North Carolina,		9,890	
Virginia,		19,000	
Total crop	1830-40	bales	2,162,663
"	1838-39	"	1,365,698
"	1837-38	"	1,801,497
"	1836-37	"	1,422,930
"	1835-36	"	1,360,725
"	1834-35	"	1,254,328
"	1833-34	"	1,205,394
"	1832-33	"	1,070,438
"	1831-32	"	967,477
"	1830-31	"	1,038,848
"	1829-30	"	976,815

From this it appears that the cotton crops of the last ten years average 1,367,595 bales. In regard to the growing crop there are as many reports of damage done by floods and worms as ever. In opposition to those reports, however, the weather throughout the cotton sections has, we believe, been unusually good for the season. This fact is a favorable one. The receipts of new crop thus far continue to exceed the receipts at the same time last year. At New Orleans the receipts of new crop are as 24,725 against 13,302 bales last year. At Mobile old cotton is quoted 7 to 9½, and new 9 to 10½. In this market the transactions have been small, at the following rates: Upland, 8½ to 10½; New Orleans 10½; Mobile 8½ to 10½; Florida, 8½ to 10½.

MODE OF LIVING OF THE PRIMITIVE SETTLERS OF THE VALLEY OF VIRGINIA.

From Kercheval's History of the Valley of Virginia.

The first houses erected by the primitive settlers were log cabins, with covers of split clapboards, and weight-poles to keep them in place. They were frequently seen with earthen floors; or if wooden floors were used, they were made of split puncheons, a little smoothed with the broadaxe. These houses were pretty generally in use since the author's recollection. There were, however, a few frame and stone buildings erected previous to the war of the revolution. As the country improved in population and wealth, there was a corresponding improvement in the erection of buildings.

When this improvement commenced, the most general mode of building was with hewn logs, a shingle roof and plank floor, the plank cut out with the whip saw. Before the erection of saw mills, all the plank used in the construction of houses was worked out in this way. As it is probable some of my young readers have never

seen a whip saw, a short description of it may not be uninteresting. It was about the length of the common mill saw, with a handle at each end transversely fixed to it. The timber intended to be sawed was first squared with the broad-axe, and then raised on a scaffold six or seven feet high. Two able-bodied men then took hold of the saw, one standing on the top of the log and the other under it, and commenced sawing. The labor was excessively fatiguing, and about one hundred feet of plank or scantling was considered a good day's work for the two hands. The introduction of saw mills, however, soon superseded the use of the whip saw, but they were not entirely laid aside until several years after the war of the revolution.

The dress of the early settlers was of the plainest materials—generally of their own manufacture; and if a modern "belle" or "beau" were now to witness the extreme plainness and simplicity of their fashions, the one would be thrown into a fit of the hysterics, and the other frightened at the odd and grotesque appearance of their progenitors.

Previous to the war of the revolution, the married men generally shaved their heads, and either wore wigs or white linen caps. When the war commenced, this fashion was laid aside, partly from patriotic considerations, and partly from necessity. Owing to the entire interruption of the intercourse with England, wigs could not easily be obtained, nor white linen for caps.

The men's coats were generally made with broad backs, and straight short skirts, with pockets on the outside having large flaps. The waistcoats had skirts nearly half way down to the knees, and very broad pocket flaps. The breeches were so short as barely to reach the knee, with a band surrounding the knee, fastened with either brass or silver buckles. The stocking was drawn up under the knee-band, and tied with a garter (generally red or blue) below the knee, so as to be seen. The shoes were of coarse leather, with straps to the quarters, and fastened with either brass or silver buckles. The hat was either of wool or fur, with a round crown not exceeding three or four inches high, with a broad brim.* The dress for the neck was usually a narrow collar to the shirt, with a white linen stock drawn together at the ends, on the back of the neck, with a broad metal buckle. The more wealthy and fashionable were sometimes seen with their stock, knee and shoe buckles, set either in gold or silver with brilliant stones. The author can recollect, when a child, if he happened to see any of those finely dressed "great folks," as they were then termed, he felt awed in their presence, and viewed them as something more than man.

The female dress was generally the short-gown and petticoat, made of the plainest materials. The German women mostly wore tight calico caps on their heads, and in the summer season they were generally seen with no other clothing than a linen shift and petticoat—the feet, hands, and arms bare. In hay and harvest time, they joined the men in the labor of the meadow and grain fields. This custom, of the females laboring in the time of harvest, was not exclusively a German practice, but was common to all the northern

people. Many females were most expert mowers and reapers. Within the author's recollection, he has seen several female reapers who were equal to the stoutest males in the harvest field. It was no uncommon thing to see the female part of the family at the hoe or the plough; and some of our now wealthiest citizens frequently boast of their grandmothers, ay, mothers too, performing this kind of heavy labor.

The natural result of this kind of rural life was, to produce a hardy and vigorous race of people. It was this race of people who had to meet and breast the various Indian wars and the storms of the revolution.

The Dutchman's barn was usually the best building on his farm. He was sure to erect a fine large barn, before he built any other dwelling-house than his rude log cabin. There were none of our primitive immigrants more uniform in the form of their buildings than the Germans. Their dwelling-houses were seldom raised more than a single story in height, with a large cellar beneath; the chimney in the middle, with a very wide fire-place in one end for the kitchen, in the other end a stove room. Their furniture was of the simplest and plainest kind; and there was always a long pine table fixed in one corner of the stove room, with permanent benches on one side. On the upper floor garrets for holding grain were very common. Their beds were generally filled with straw or chaff, with a fine feather bed for covering in the winter. The author has several times slept in this kind of bed; and to a person unaccustomed to it, it is attended not unfrequently with danger to the health. The thick covering of the feathers is pretty certain to produce a profuse perspiration, which an exposure to cold, on rising in the morning, is apt to check suddenly, causing chilliness and obstinate cough. The author, a few years ago, caught in this way the most severe cold, which was followed by a long and distressing cough, he ever was afflicted with.

Many of the Germans have what they call a drum, through which the stove-pipe passes in their upper rooms. It is made of sheet iron, something in the shape of the military drum. It soon fills with heat from the pipe, by which the rooms become agreeably warm in the coldest weather. A piazza is a very common appendage to a Dutchman's dwelling-house, in which his saddles, and very frequently his wagon or plough harness, are hung up.

The Germans erect stables for their domestic animals of every species: even their swine are housed in the winter season. Their barns and stables are well stored with provender, particularly fine hay: hence their quadrupeds of all kinds are kept throughout the year in the finest possible order. This practice of housing stock in the winter season is unquestionably great economy in husbandry. Much less food is required to sustain them, and the animals come out in the spring in fine health and condition. It is a rare occurrence to hear of a Dutchman's losing any part of his stock with poverty. The practice of housing stock in the winter is not exclusively a German custom, but is common to most of the northern people, and those descended from immigrants from the north. The author recollects once seeing the cow stalls adjoining the farmers' dwelling.

The German women, many of them, are re-

* The Quakers were remarkable for their broad brim hats. They were sometimes called "Broadbrims," by way of distinguishing them from other people.

markably neat housekeepers. There are some of them, however, extremely slovenly, and their dwellings are kept in the worst possible condition. The effluvia arising from this want of cleanliness is in the highest degree disgusting and offensive to persons unaccustomed to such fare. The same remarks are applicable to the Irish; nay to some native Virginians. The Germans are remarkable for their fine bread, milk and butter. They consume in their diet less animal flesh, and of course more vegetables, milk and butter, than most other people. Their "sour krout"* in the winter constitutes a considerable part of their living. They generally consume less, and sell more of the product of their labor, than any other class of citizens. A Dutchman is proverbial for his patient perseverance in his domestic labors. Their farms are generally small and nicely cultivated. In all his agricultural pursuits his meadows demand his greatest care and attention. His little farm is laid off in fields not exceeding ten or twelve acres each. It is rarely seen that a Dutchman will cultivate more than about ten or twelve acres in Indian corn any one year. They are of opinion that the corn crop is a great exhauster of the soil, and they make but little use of corn for any other purpose than feeding and fattening their swine.

Previous to the war of the revolution, and for several years after, considerable quantities of tobacco were raised in the lower counties of the valley. The cultivation of this crop was first introduced and pursued by immigrants from the eastern counties of Virginia. From the newly cleared lands, two crops of tobacco in succession were generally taken, and it was then appropriated to the culture of other crops. The crop of tobacco left the soil in the finest possible state for the production of other crops. Corn, wheat, rye, flax, oats, potatoes, and every thing else, were almost certain to produce abundant crops, after the crop of tobacco.

In the year 1793 the French revolution broke out, when bread stuffs of every kind suddenly became enormously high; in consequence of which, the farmers in the valley abandoned the cultivation of tobacco, and turned their attention to wheat, which they raised in vast quantities for several years. It was no uncommon thing for the farmer for several years after the commencement of the French revolution, to sell his crops of wheat from one to two, and sometimes at two and a half dollars per bushel, and his flour from ten to fourteen dollars per barrel in our seaport towns.

In the year 1796, the Hessian fly first made its

* "Sour krout" is made of the best of cabbage. A box about three feet in length, and six or seven inches wide, with a sharp blade fixed across the bottom, something on the principle of the jack plane, is used for cutting the cabbage. The head being separated from the stalk, and stripped of its outer leaves, is placed in this box, and run back and forth. The cabbage thus cut up is placed in a barrel, a little salt sprinkled on from time to time, then pressed down very closely, and covered over at the open head. In the course of three or four weeks it acquires a sourish taste, and to persons accustomed to the use of it, is a very agreeable and wholesome food. It is said that the use of it, within the last few years, on board of ships, has proved it to be the best preventive known for the scurvy. The use of it is becoming pretty general among all classes of people in the valley.

appearance in Virginia. Its ravages that year were limited, and but little damage was sustained in the crops of wheat. The crop of 1797, in the counties contiguous to the Potomac, was generally destroyed, and the same year partial injury was discovered in Frederick county. The crop of 1798, throughout the county of Frederick, was nearly destroyed. Ever since which time the farmers have annually suffered more or less from the ravages of this destructive destroyer. This insect had prevailed in some of the northern states for several years before it reached Virginia. It is said it first appeared on Long Island, and was believed to have been imported by the Hessian troops in their straw bedding in the time of the war of the revolution. If this be true, it was a woful curse upon our country,—of which it probably will never be relieved. The present generation have abundant cause to execrate the inhuman policy of our parent state in bringing upon us this heavy calamity, and all future generations will probably join in condemning the British ministry who forced upon our ancestors that unrighteous and disastrous war.

FUEL.

From the Cultivator.

Economy of Fuel.—We have examined, with interest, a small work, detailing "*Experiments to determine the comparative quantity of heat evolved in the combustion of the principal varieties of wood and coal, used in the United States for fuel; and also to determine the comparative quantity of heat lost by the ordinary apparatus made use of for their combustion.*"—By Marcus Bull."

The experiments seem to have been made with great care and accuracy, and the results afford matter of interest to every householder.

Mr. Bull has computed the cost of fuel consumed in Philadelphia, in a given year, to be \$80,043, which being divided among the population, gives \$7.04 as the average cost of fuel to each inhabitant, supposing the consumption to be equal. Adopting this estimate as a fair average for the population within ten miles of tide-water, in the Atlantic states, from Maine to Georgia, it gives an aggregate of twenty-one millions of dollars as the annual cost of fuel for this portion of population, which is assumed to amount to three millions and a half of our population at half the above price, or \$3.50 to each individual, he gives us an aggregate amount of about fifty-one millions of dollars as the total annual expense of fuel, for every purpose in the United States.

The economy of fuel is to be studied—1, in the kind to be selected for use; 2, in its quality and preparation for use; and 3, in the choice of the apparatus in which it is to be used.

In regard to wood.—The quantity of heat evolved by a cubic foot of the several kinds, when in a perfectly dry state, is very nearly in the ratio of their specific gravity, or relative weight, as for example, the specific gravity of shell-bark hickory being 1.000, a cord weighs 4,469 lbs.; by the same scale, the specific gravity of white pine is .476, and the cord weighs only 1,868 lbs. The quantity of heat evolved by a pound of white pine is as great as that evolved by a pound of hickory. The difference in value arises from the great disparity in weight—the hickory weighing as 22, and the

pine as 9—and their relative value being hickory 100, white pine 42—or the first being considerably more than twice as valuable as the latter. The table which we shall append will exhibit the relative value of the different kinds of fuel in common use.

Charcoal forms a considerable item of fuel; and the facts which Mr. Bull has given us upon this subject will be found to be new and interesting. The value of charcoal, like that of wood, is principally to be determined by its weight—a pound from one kind of wood affording about as much heat as a pound from another kind. The quantity, or rather weight, of charcoal, afforded by the different kinds of wood, is nearly in proportion to the relative weight of the wood. Thus hickory produces 26.22, the specific gravity of the dry coal being .625; while the white pine produces 24.35, and the specific gravity of the dry coal being only .298. Thus, whether burnt in the form of wood or of charcoal, a cord of hickory affords more than twice the heat that is found in a cord of white pine. The value of charcoal, however, depends much upon the manner in which it is prepared. The more completely the atmospheric air is excluded from the wood, while under the process of being charred and the more heat that is given to it, the heavier, the harder, and the better will be the product. The best charcoal will be found of a slate color on its surface, dense, sonorous and brittle; while inferior qualities approach to a jet black, and are soft and powdery, upon the exterior. To obtain the best quality, Mr. Bull recommends that the wood be piled in a single tier, that charcoal dust be interposed between the wood, that the pile be covered with clay, and then a layer of sand, to close the cracks which the fire may cause in the clay, and that the fire be communicated at the exterior base, and in the centre and from the top. An intelligent collier, who partially adopted Mr. Bull's recommendation, gained by it 10 per cent. in quantity by measure, and Mr. B. found the coal nearly 20 per cent. heavier than usual. If these facts are correct, and we have no reason to doubt them, it would be an excellent police regulation in our towns, to have charcoal sold by the weight, instead of by measure, and would ultimately be beneficial to the seller as well as to the buyer.

The loss in weight which wood undergoes in drying, and the moisture which it absorbs, by exposure, after it has become dry, are matters of considerable interest to the farmer and the consumer. Hickory wood cut green, and made absolutely dry, experienced a diminution in its weight of 37½ per cent., white oak lost 41 per cent., and soft maple 48 per cent., or very near one-half. Both wood and charcoal, after being made perfectly dry, absorbed in twelve months, under cover, from 8 to 12 per cent. of moisture.

If we assume, says Mr. B. the mean quantity of moisture in the woods, when green, at 42 per cent, the great disadvantage of attempting to burn wood in this state, [or transport it a distance,] must be obvious, as in every 100 lbs. of this compound of wood and water, 42 pounds of aqueous matter must be expelled from the wood, [or transported;] and as the capacity of water for absorbing heat is as 4 to 1, when compared with air, and probably greater during its conversion into vapor, which must be effected before it can escape, the loss of heat must consequently be great.

Common names of Woods and Coals.	Specific gravity of dry wood.	Avoirdupois pounds of dry wood in a cord.	Product of charcoal from 100 parts of dry wood by weight.	Specific gravities of dry coal.	Pounds of dry coal in one bushel.	Pounds of charcoal from one cord of dry wood.	Bushels of charcoal from one cord of dry wood.	Time 10° of heat were maintained in the room by the combustion of 1 lb. of each article.	Value of specified quantities of each article, compared with shell bark hickory as standard.
White ash.....	.772	3.450	25.74	.547	28.78	888	31	6 H. 40 M.	77 Cords.
White beech.....	.724	3.236	19.62	.518	27.26	685	28		65
Black birch.....	.697	3.115	19.40	.428	22.52	604	27		63
Chestnut.....	.522	2.333	25.29	.379	19.94	580	30		53
White elm.....	.580	2.592	24.85	.357	18.79	644	34		58
Shell-bark hickory.....	1.000	4.469	26.22	.625	32.89	1,172	36		100
Pig nut hickory.....	.949	4.241	25.22	.637	33.52	1,070	32		95
Red heart hickory.....	.829	3.705	22.90	.609	26.78	848	32		61
Horn beam, (iron wood,)..	.720	3.218	19.	.455	23.94	611	25		65
Hard maple.....	.644	2.878	21.43	.431	22.68	617	27		60
Soft maple.....	.697	2.668	20.64	.370	19.47	551	28		64
White oak.....	.855	3.821	21.62	.401	21.10	826	39		81
Shell-bark white oak.....	.775	3.464	21.50	.437	22.99	745	32		81
Pin oak.....	.747	3.339	22.22	.436	22.94	742	32		74
Red oak.....	.728	3.254	22.43	.400	21.05	630	30		71
Rock chestnut oak.....	.678	3.030	20.86	.436	22.94	632	28		69
Pitch pine.....	.426	1.904	26.76	.298	15.68	510	33		61
White pine.....	.418	1.868	24.35	.245	15.42	455	38		48
Lombardy poplar.....	.397	1.774	25.		12.89	444	34		42

The above is merely an abstract of Mr. Bull's table, comprising merely the woods in most common use among us. The last column exhibits the relative value of a cord, according to the heat which each affords. Thus, if hickory is worth one dollar, pig nut hickory is worth 95 cents, hard maple 60, white oak 81 cents, white pine 42 cents, pitch pine 43 cents, &c.

We will now exhibit, in tabular form, the relative value of coals, by the same standard, merely remarking, that a ton of anthracite coal is considered about equal to a cord of shell bark hickory.

COALS.	Specific gravity of dry coal.	Pounds of dry coal in one bushel.	Time 10 deg. of heat were maintained in the room by the combustion of 1 pound of each article.	Value of specified quantities of each article, compared with shell-bark hickory as the standard.
			H. M.	Tons.
Lehigh	1.494	78.61	13 10	99
Lacawana	1.400	78.67	13 10	99
Rhode Island	1.438	75.67	9 30	71
Schuylkill	1.453	76.46	13 40	103
Susquehanna	1.373	72.25	13 10	99
Worcester	2.104	110.71	7 50	59
				100 bushels
Liverpool	1.240	65.25	10 30	230
Richmond	1.246	65.56	9 20	205
Hickory char.	.625	32.89	15	166
Maple do.	.431	22.68	15	114
Oak do.	.401	21.10	15	106
Pine do.	.285	15.	15	75
Coke	.557	29.31	12 50	126

Economy of Burning.

Mr. Bull's experiments were made in a sheet iron stove, with 42 feet of two inch pipe, having about 20 elbows. A thermometer placed at the mouth of this pipe indicated the same temperature as another hung against the wall of the room, which showed that all the heat given off by the combustion of the fuel, was retained in the room. On the supposition that 100 lbs. of fuel, consumed in this stove, would maintain a temperature of 60 degrees for 12 hours, he found, that to maintain the like temperature for the same time, by other apparatus the fuel must be increased as follows:

In the experiment stove it required - - lbs. 100

In the sheet iron cylinder stove, the interior surface coated with clay lute, with nine elbow joints, and 13½ feet of 2 inch pipe, 105

In a like stove and pipe, with 3 elbow joints, 122

In a like stove, and similar pipe and joints, but the pipe placed more vertical than the preceding, - - - - - 128

In a like stove, with 5 feet of pipe and one elbow, - - - - - 149

In a like stove, without clay lute, one elbow, and five feet of four inch pipe, 222

In an open Franklin, with one elbow, and five feet of six inch pipe, - - - - - 270

In an open ordinary parlor grate, - - - - - 555

In an open chimney fire place, - - - - - 1,000

It would seem from these experiments, that nineteenthths of the heat given off by fuel burnt in an ordinary fire-place, are carried off in the draft,

without benefiting the room; that nearly one-half is wasted when the fuel is consumed in an open parlor grate, and that lining a stove with fire brick, or clay lute, produces a great economy in fuel.

The experiments afford important suggestions to the housekeeper. Assuming as data, that four cords of dry shell-bark hickory, burnt in a sheet iron cylinder stove, with five feet of pipe and one elbow will warm an ordinary room during the winter months, it will require to keep up the like temperature, in a similar stove, the following quantities of other materials:

Hickory, as stated	- - - 4	cords,
White oak,	- - - 4 3-4	"
Hard maple,	- - - 6 2-3	"
Soft maple,	- - - 7 1-5	"
Pitch pine,	- - - 9 1-7	"
White pine,	- - - 9 1-5	"
Anthracite coal,	- - - 4	tons.

THE ARMY WORM.

From the Plesyune.

Mr. Editor,—Having seen in your interesting hebdomadal a request that some one of your country readers would favor you with a quantity of the caterpillar or army-worm, I accordingly send you a number of these voracious and destructive worms alive, and a few of the aurelia or chrysalis, being the change that the caterpillar undergoes previous to its metamorphosis into the moth or butterfly. I also send you a cotton stalk, that you may see how completely these worms strip the plant of its leaves, blossoms, buds, and young bolls or pods.

I put a number of the chrysalis in a glass shade, which were in a few days transformed into a dirty brown-colored, mealy-winged moth, somewhat similar in appearance to the moth commonly called the *miller*. These moths are believed to deposit their eggs on the reverse of the leaf. The young worm at first is not thicker than a fine needle. It eats a small portion of the under part of the leaf around it, without penetrating through. Having acquired strength, it ascends the upper side of the leaf, devouring every part, with the exception of the fibres, as you will see by the accompanying plant. While the myriads are engaged in their work of destruction, a sickly, somewhat fetid smell exhales, and a noise is heard like a gentle rain, caused by the forcep-shaped mouths of the intruders devouring their food, and their excrements pattering on the leaves in their descent. The latter are so abundant that the ground under the plant is discolored.

Having heard that the plantations of my neighbors had been overrun with this scourge a short time before I perceived any signs, I flattered myself that I would escape; but going one morning into the field, I found it literally covered, and a few days sufficed to strip it entirely. Desirous of discovering the means of destroying the worm or arresting its ravages, I caused a quantity of roll-brimstone to be pulverized, and a spoonful put around the root of forty or fifty plants, thinking that the deleterious principle would be absorbed by the plant, and cause the worm to abandon it. This was attended with no effect. I caused two or three to be fumigated, but the worms remained

on the leaves until they withered and the plant died. I then caused lime to be sprinkled on several rows of plants, in the morning, previous to the evaporation of the dew, that it might adhere to the leaf. This caused the caterpillars to abandon the surface and betake themselves to the under part of the leaf. I find that the plants on which this experiment was made have not suffered as much as the others.

Some eight or ten evenings since, a considerable number of the moths came into my house, where, attracted by the light of the candles, they burnt their wings.

This circumstance made it recur to my memory that I had formerly heard old planters state they had arrested the ravages of these destructive worms by making numerous large fires in their fields after dark.

Three days previous to the visit of the caterpillar, my field presented a beautiful green appearance; the plants were covered with the blossom and bolls, and I have every reason to believe that I would make about 300 bales of cotton. Now it is sear and yellow, exhibiting a most desolate aspect, and I do not expect to make over 100 bales.

STEPHEN HENDERSON.

Baton Rouge, Sept. 25, 1840.

POSTSCRIPT, ON KENTUCKY BLUE-GRASS (OR VIRGINIA GREEN-SWARD.)

To the Editor of the Farmers' Register.

Frankfort, October 26, 1840.

Dear Sir:—I learn from a very intelligent Virginia friend, who did me the favor to dine with me since the date of my letter of the 22d inst., that the *Virginia wire-grass* is not the same so called here. Indeed, he stated that he had never seen any *wire-grass*, so known in Virginia, in this state. Here is another illustration of the utter confusion in the popular nomenclature of plants, &c.

That which I have been taught to designate by the vulgar name *wire-grass*, is not a graminaceous but a small herbaceous plant, having a strong tap-root from which small fibrous roots are sent out like those from the beet. Its branches run along the ground, and the leaf is very small, short and oval shaped. Blue-grass here obtains an easy victory over it.

My Virginia friend requests me to say to your correspondent that, "if he will swop his *wire-grass* for Kentucky blue-grass, he need not fear getting a witch for his devil; but will certainly obtain an angel instead."

I have no doubt our "angel" would easily conquer your "devil." Nothing can stand before it here, and I see not why it would not prove equally potent in your state. Mr. Flint beautifully compares its habits to those of the robin red-breast—delighting in the haunts of men. But you can easily test its value by a small experiment on an acre of marled land. It would no doubt thrive well in your yards, by giving it a spring dressing of leached ashes or old lime.

Perhaps it may be acceptable to your correspondent to add, that our blue-grass pastures are easily cultivated when we wish to subject them to the plough. A strong two-horse plough can easily run through the closest turf. The best prac-

tice here is, first to run just through the sod and turn it flat over; then following in the same furrow, bury it beneath the soil brought up by the second plough. Frequently, a third plough follows in the same furrow; but the expediency of this is determinable by the character and depth of the soil. You published a letter of mine to the Franklin Farmer a few weeks (or months) ago, on the improvement of the soil resulting from the grazing system, which, your correspondent will find, has something in it applicable to the subject now considered. The blue-grass sod, thus disposed of, never troubles us in the after culture; but I doubt if you have sufficient depth of soil thus to dispose of it. If, however, you have, you need never fear being troubled by our blue-grass, if you desire to turn a pasture of it into tillage.

Yours truly,

THO. B. STEVENSON.

BARNUM'S MACHINE FOR HEATING WATER.

From the American Farmer.

This new apparatus for "*heating water*" is represented as a great improvement over others, by certificates, as to its economy and despatch, both in its cost and operation, founded on actual experiment and use of the machine.

The apparatus we saw was on board the steam-boat Maryland, in possession of Mr. Wm. Nabb, of Talbot county. Its cost was \$15. Having no tact for description of machinery, we cannot undertake to explain its construction or *modus operandi*.

It consists of a copper hollow cylinder in diameter about the size of a two gallon whisky jug—(we like to illustrate by *familiar objects*)—This cylinder stands upright on feet perhaps about 12 or 15 inches from the ground, the cylinder itself being about 18 inches long or high. On a grate which lies inside and across at the bottom of this is built a fire with coal or any light wood. On the top, dropping down within it a few inches, stands a flue or chimney of sheet iron, with a small door like a stove-door to drop in the coal or wood. Then there are from this cylinder two copper tubes, one exactly, and a few inches, above the other, about the size of a lady's wrist, (we have seen some ankles not much larger.) These tubes connect with the wooden vessel containing the water to be boiled, which stands at a small distance, say 12 or 18 inches off. Thus the water which is placed in the wooden vessel passes through the tubes, and around the copper cylinder, and the heat of the little furnace within the cylinder puts the water in motion, and keeps up a constant circulation or revolution, and it is asserted by all the signers of these certificates, that while the water is made to boil much quicker than by the ordinary process, there is a saving of more than half the fuel. It has, too, the advantage of being useable out of doors, and portable from one point to another. It is getting into common use among hatters; also where much washing is to be done—for boiling food for hogs, and water for cleaning hogs, &c.

The apparatus, as appears by a card before us, is sold by James Cortlan, No. 10, Baltimore, and No. 6, Harrison-street, Baltimore. What particu-

larly drew our notice to it was the supposition that, besides other uses, it may be the very thing wanted for cooking food for domestic animals. We have said at least enough to guide those who may desire, what is best in all such cases, *to see and judge for themselves.*

REPUBLICATION OF TAYLOR'S 'ARATOR.'

We lately received, from a gentleman in the west, distinguished for his ability as a writer on agriculture, and his acquaintance with the works of others on that subject, a letter containing the following passage:

"I am almost ashamed to own I have never seen a copy of Col. Taylor's 'Arator.' I have endeavored for years to get it; but have never been so fortunate as to find it either in the shops or private hands, though I have made many inquiries. I presume it must be nearly out of print; but it is probable some one in your neighborhood would sell his copy. If you can thus or otherwise procure me a copy, without troubling yourself, I shall deem it a singular favor."

Some years ago a similar request, upon the same grounds, was received from the deceased Judge Buel, which we took pleasure in complying with, by presenting him with one of our then spare copies—as we would do now, for the recent applicant, except that we have but one copy left, and have in vain sought in this town for another, to present to our correspondent. This new evidence of the scarcity of this work has induced the early completion of a design which had been before entertained and postponed, that is, the publication of a new edition of 'Arator' in the Farmers' Register. This will be done in the next number, which will be made to contain the entire work.

HOVEN CATTLE.

From the American Farmer.

One of my cows, a very valuable animal of the common breed, lately became bloated or "hoven," in consequence of getting into the barn-floor through a door which was carelessly left open, and eating her fill of potatoes. She was swelled up, as tight as the skin could hold in about twelve or fifteen hours after eating them. Upon discovering the painful and dangerous situation of the cow, I immediately sent for a neighbor who had frequently relieved hoven cattle by plunging a knife into the paunch, and thus affording an exit for the confined air.—This was done first with a pen-knife then with a Spanish dirk knife, without the desired effect, no air escaping through the puncture. Being anxious to relieve the suffering animal, it occurred to me that what would be beneficial in the human subject, under similar circumstances, or in Tympanites intestinalis, might possibly give relief. I lost no time until I had a decoction of *anise and fennel seed*, prepared by boiling for a

few minutes a handful composed of equal quantities of the two, in a pint of water.—This I added to a pound of hog-lard, and bridling the cow, raised her head by pulling the reins over the top rail of a fence, and gave it to her in the usual way. She appeared to be sinking so fast now, that we drove her out to a field to die. When there she soon laid down, very much exhausted, and panting laboriously, seemed to be rapidly approaching the end of her sufferings. I now concluded to try another dose of the carminative and lard, having observed that she frequently eructated, since giving the first dose. We accordingly had another prepared, in all respects like the first. This we had no difficulty in getting down, *as she lay*, without the bridle.—Shortly after the exhibition of this dose, the air began to roll in large and frequently repeated volumes, up the gullet—this effect of the medicine continuing at short intervals—in half an hour the cow was quite relieved, and walking about. The effect of this simple remedy was indeed most admirable, and deserves to be known by every person owning a cow. One of my neighbors has since experienced the good effects of it in the case of a cow that had become hoven in consequence of eating corn and corn-fodder in the shock. It may not be amiss to mention that the lard, in the above prescription, was recommended, in the first place as a purgative, and therefore became a part of the drench. Tar was put on the puncture, and it healed kindly.

R. NEBINGER.

Lewisburg, Pa. Oct. 20, 1840.

MEETING OF TOBACCO PLANTERS.

At a large and respectable meeting of the tobacco planters of the county of Dinwiddie, held at the Court-house, on the 19th of October, 1840,

Col Benjamin Johnson was called to the chair, and Wm. M. Gill appointed secretary.

The object of the meeting was explained by Dr. H. C. Worsham, who presented for its consideration the following preamble and resolutions, and urged their adoption by a brief and spirited address.

On motion of Capt. John H. Edwards, they were then unanimously adopted:—

That in conformity to the principles of our government, we cherish and entertain towards all nations feelings of amity and respect, and desire a perpetuation of the same so long as they can be maintained upon just and liberal principles: That as a government we have extended the olive branch to all nations, and offered to all, trade and commerce upon terms of mutual reciprocity; and whilst our liberality has been freely accepted and extensively enjoyed, we have received, in return, comparatively little else than monopoly and exclusion: That whilst several of the nations of Europe are literally inundating our country with their luxuries, nearly duty free, thereby poisoning our morals and enervating our constitutions. Tobacco, the most valued staple of nearly two millions of American freemen, is allowed to be taxed in their countries from one hundred to upwards of eight hundred per cent.: That whilst the powers of reason have stripped this exorbitancy of every legitimate basis of support, it is still persisted in, regard-

less of its unfeeling exaction, and sought alone to be sustained as a revenue principle: That a longer submission to so gross, palpable, and iniquitous an imposition, is incompatible with our feelings of independence, and at war with the principles of international justice: That whilst in a spirit of peace we have submitted to the odious and monopolizing Corn Laws of England, we utterly repudiate, as revolting to our sense of justice, the idea of a longer submission to the enormous and oppressive duties now imposed upon our tobacco.—Therefore

Resolved, 1st. That we highly approve the call of a convention of tobacco planters, to assemble at Washington City on the 15th of December next, and earnestly urge our sister counties to hold timely meetings and respond to the call.

Resolved, 2d. That our representatives in congress be instructed, and our senators requested, to use their utmost exertions for the introduction and support of such measures, as shall in their wisdom be deemed best calculated to secure a speedy reduction of the duties upon tobacco to a rateable standard with the most favored articles of foreign importation.

Resolved, 3d. That the sincere thanks of the meeting be cordially tendered to the Hon. Daniel Jenifer, of Maryland, for the zeal which he has manifested in his advocacy of the tobacco-growing interest.

On motion of Herbert Reese,

Resolved, That the chairman of this meeting appoint six delegates to represent this county in said convention, with the special understanding, previously ascertained, that all will attend.

Whereupon the following gentlemen were designated:—H. C. Worsham, John W. Gilliam, James W. Eppes, Abner Adams, John Hardaway, and Wm. M. Gill.

On motion of Capt. John H. Edwards,

Resolved, That Geo. C. Dromgoole and Hugh A. Garland, be appointed alternates to represent this county in said convention, with the special request that they attend.

On motion of Capt. Daniel Butts,

Resolved, That a copy of the proceedings of this meeting be forwarded to the Hon. Daniel Jenifer, to our representative in congress, to the Hon. H. A. Garland, and to each of our senators.

On motion of James W. Eppes,

Resolved, That a copy of the proceedings of this meeting be signed by the chairman and secretary, and forwarded to the Petersburg Statesman, and Intelligencer, the Richmond Enquirer, and Whig, the American Farmer, and Farmers' Register, for publication.

On motion of Dr. H. C. Worsham,

Resolved, That this meeting now adjourn.

BENJ. JOHNSON, *Chairman*.

WM. M. GILL, *Secretary*.

THE DRAINED POND.

From the Farmers' Monthly Visitor.

There is at the point of this road, where the waters of the Passumpsic and the waters running north into lake Memphremagog and the river St. Lawrence have their source, a natural curiosity which goes to confirm our theory that the rich

amphitheatres among the hills constituting some of the best townships of Vermont were originally lakes and ponds of water. In the town of Glover up to the year 1817 near the summit level there was a pond of considerable extent, which discharged its waters on the way to Long Island Sound through the valley of the Passumpsic. In the first settlement of the wilderness beyond towards Canada, a man had erected a mill below the level of the pond on a small stream running the other way. As he had a deficiency of water it occurred to him that he might bring to his aid a portion of the waters in the pond, there being only a small ridge barring them out. He commenced digging out a passage way upon the surface of the ridge, and found the soil so pliable that the work of an hour or two brought it down to the surface of the pond. The water began to flow, and in a few minutes made such progress that he barely had time to run to the mill and alarm his wife whom he knew to be there so that she might retreat to a place of safety. The artificial or natural ridge was not able to stand for a moment when the water had once gained headway. Down it came, taking off the mill in a moment, and carrying along with it trees and rocks weighing many tons and every other obstruction, sweeping down to the lake an immense mass of material. Since that time a simple brook running towards the lake Memphremagog is all that is left of the pond; and the ground constituting and surrounding its bed, is just like that of other valleys on which we suppose the water to have rested in days long subsequent to the creation. The travelled road pursues its course through the bed of this pond.

Returning to our journey; there has grown up within a very few years a considerable village called North Danville upon a stream which from the height of land unites with the Passumpsic at St. Johnsbury.

FOOD FOR STOCK. CYMBELIN (OR SQUASH) CULTURE.

From the American Farmer of 1820.

Mr. Skinner.—A writer for your paper of the 7th ult. over the signature of Silvanus, has offered excellent advice for curing bacon, and insists that the hogs for this purpose must be corn-fed. How long must they be so fed, is the question?

Experience has shown, that it requires but a very short time, to entirely change the flavor and texture of all kinds of flesh. In the year 1770, I resided in New Jersey, where it was the custom to take great numbers of wild pigeons in spring-nets, by the assistance of decoy pigeons, prepared for the purpose. The flesh of these birds, when first taken, is always very dark, and most generally tough. I have seen more than 300 of them confined, and fed in a large corn-house, and in one week, their flesh has not only become tender, but as white as a well fed chicken.

In 1784, I promised to present to a brother, just married, a prime beef towards his winter stores,—I had a fine steer and a spayed heifer, in a large wheat field, abounding with wild garlic; my brother named a day to send for his beef, and three days previous, we killed the heifer, which although extremely fat, was to my great disappoint-

ment so thoroughly tainted with garlic, even to the marrow in the bones, that my house servants refused to eat it.—A bad prospect for my brother, whose wagon came the fourth day, and in despair I killed his beef, which was beautiful to the eye. I did not at the time pay much attention to a remark of his feeder, who observed that the steer had not eat any thing since the heifer was killed; my trouble was, the certainty of my brother's disappointment, but to my great joy, I soon received his letter of thanks saying, that a more juicy, tender, and fine flavored beef, could not be.

Take two lambs of equal age from a garlic pasture, kill one immediately, and the flesh will be so tainted with the garlic, that no person of tolerable taste can eat it; keep the second from all food for one night or ten hours, and there will not be the slightest garlic taste. It is well known that cattle fed upon oil cake, cannot be immediately killed; but if kept from this food for two or three days, the oily taste is removed.

The foregoing facts are known to every experienced farmer, and they have convinced me, that hogs fed upon corn for two weeks, are much better than two months, for the plain reason that the flesh is equally good, and the expense is less.

Hogs, as generally managed, are not only the most troublesome, but the most costly flesh we consume, and I have for many years been in pursuit of a plan to lighten the cost of their flesh which is so absolutely necessary for the establishment of every Marylander. I flatter myself that I now see my way clear; for after two years' trial, I am well satisfied, that the use of cymbkins, pumpkins, ruta бага and clover will enable me to send more corn to market, and with two weeks feeding upon that precious grain, my bacon will not yield to that of any person. No branch of rural economy requires more attention than feeding our various kinds of stock. Our northern friends laugh, and say, that in Maryland the hogs eat all our corn, and our negroes eat all our hogs. This is too true to be denied, and if my mite can in your opinion be of any use to the public, it is at your service.

As early as the season will admit, I prepare ground for cymbkins, or squashes (*cucurbita verucosa*.) Rich land is best for all purposes, but in this case, it is the first object to choose a place convenient to your hogs' range. After ploughing and preparing the ground in the best manner, lay it off by a single furrow, four feet each way, and at the intersection, manure highly with well prepared manure, mixing it well with the soil, by spade or hoe. Upon this ground so prepared, plant cymbkins (and the bunch kind I think best,) in every other row and hill, which will give to you at eight feet apart each way, about 680 hills to the acre. After planting the cymbkins, proceed to plant corn in the rows running north and south, that is only in one direction, between every row of cymbkins, and which being eight by four apart, will give you about 1361 hills of corn to the acre. It is unnecessary to remind the careful farmer, that the most scrupulous attention should be paid to this ground, while the vines are young, for after they begin to fruit, and run, nothing can be done, except to pull by hand the strong high weeds.—When the fruit appears, be careful to mark for future seed, such as you wish to propagate, for it is desirable to have early fruit.

The drought of last summer will not be soon forgotten, and yet from less than an acre of unfavorable ground, I kept in high condition more than 60 head of hogs of all ages (sucklings excepted;) they had not any grain, and but little grass. It was our rule to take a certain number of rows every day, so that there was an interval of five days, and all fruit as large as a man's fist was pulled. It would sometimes happen, that fruit was neglected until it became hard, but not dry; in this case, the feeder cracked them upon his cart wheel.—A careful and steady person should be appointed to pull, one who will neither neglect the fruit, or tread upon the vines, for if well managed they will continue bearing until your pumpkins are ready, and these will carry you on to the fortnight before the intended day of killing.

I claim no merit from the cymbkin culture, it justly belongs to Fench Tilghman, Esq. of Talbot, and other gentlemen of that county, but, believe me, that while I continue to raise my own pork, I never will omit the cymbkin culture. Let us however not forget the pompon as an able, and almost necessary auxiliary, and of which there are many varieties; the long yellow is, I think, for many reasons, the best. In 1818 my cymbkin patch was small, and as my object was not only to have fat pork but to save corn, I began early with the pumpkins; yet hogs could not be fatter, and my stock of old hams, can yet testify the quality of the meat. Yet cymbkins and pumpkins are not alone a sufficient substitute for corn; some food is necessary to carry you through the winter and spring, until your clover and cymbkins are ready. The ruta бага is an excellent vegetable, which will supply your want. We now know that they are infinitely more nutritious than the common turnip, that they are sufficiently hardy to remain in the ground through the winter, and yet better, if buried in small heaps in a well shaded northern aspect. They will be found in high preservation to July.

Clover is less injured by hogs than by any other stock, by sheep the most, and hogs after a few days will not root it up; but it is desirable that every farm should be provided with a hog range well enclosed, uniting wood land for acorns and shade, bottom land for water, rooting and wallowing, and contiguity to clover. Ten hogs will not injure the growth of timber, as much as one cow. The hog indeed eats all the acorns he touches, but in his rootings he buries great numbers to a secure depth: the cow not only nips, and of course kills all the young sprouts of nuts, which she perseveringly hunts after, but she browses upon and tears down young limbs, and rubs and twists young sprouts from stumps.

If I have extended my remarks beyond a mere recommendation of the cymbkin culture, and with a view to save grain, which is always a cash article; it is also from a wish to encourage persons who reside upon poor lands adjoining extensive wood-ranges, to turn their attention to rearing hogs upon a large scale.

For the cymbkin, pompon, and ruta бага, but little land is necessary, and for the two first articles, but little manure. Clover is certainly of great service, but if there is plenty of the other vegetables, it may safely be dispensed with. I would give you my opinion of the quantity of ground necessary for twenty hogs, but fear I have already trespassed on your time.

I must however observe, that instead of washing my bacon with warm water, previous to hanging it, I have experienced the best effects from washing with a strong lie, made from clean hickory ashes. I am respectfully yours, &c.

A SUBSCRIBER.

TREATMENT OF PEACH TREES.

From the New Genesee Farmer.

In a late number of our paper, we noticed the difference between peach trees suffering from the *yellow*s, and from the worm at the root; but it is remarkable that some intelligent minds seem unable to comprehend the distinction. One imagines that this disease is induced by the worm; another thinks it is caused by intense cold suddenly succeeding mild weather in winter; and a third is satisfied it arises from the root soaking in mineral water. These opinions would be entitled to some respect, if the authors had respectively taken the pains to show us that the supposed cause was sufficient to explain the whole phenomena; but so carelessly have they looked at the subject, that they appear not to know that the *yellow*s is contagious. Neither do they appear to know that it commenced its ravages in Pennsylvania and New Jersey, about the year 1797. Let us ask, however, were there no peach worms, no unfavorable seasons, and no mineral springs for the trees to dip their roots in, previous to the year 1797? Peach trees were cultivated near Philadelphia for more than a century before any such diseases appear to have been known; and in western New York more than thirty years passed away, after the Indian had resigned his old peach orchard to the white man, before it was introduced amongst us, yet the worm was busy, the weather came as it listed; and the mineral springs, where there were any, soaked away as they had done for centuries before.

The origin of this disease affords an interesting subject of inquiry and speculation; but, like the origin of the small pox and measles, it will probably remain unknown; and the horticulturist may do well without such discovery, if he can be made properly to understand that it is *very contagious*. With this idea fairly before him, he will remove the sickly trees from his garden before they contaminate the others; and he will be careful not to let any tool that has been so employed, especially the saw, be used on a healthy tree before it has been thoroughly cleansed.

The peach worm, though an enemy not to be despised, rarely destroys a tree, except when it is small, or when considerable numbers attack it at the same time. It has been several years since we went round among our large trees to search for this insect; and we have no reason to think that more than two or three have suffered materially. Still we would recommend the search to every proprietor who can steal away from his other avocations.

The oozing of the gum in wet weather is no certain indication of the worm, especially if it be on the trunk a foot or more from the ground; but when the gum is crowded with filth, diligent search should be made. Remove the earth from the tree to the depth of two or three inches; and

with a strong pocket knife endeavor to find the cavity where the depredator resides. Vile as the outside of his dwelling appears, the inside is generally kept clean—(not crowded with ordure like the track of the borer.) When the knife once enters this covered way, which is cut in the pulpy part of the bark, it is commonly easy to find him; but in all cases where it is practicable, cut longitudinally, and not crosswise. When the worm is removed,—and no creature can be more helpless when he is expelled from his nest,—the hole should be laid open through its whole length, and then filled with clay mortar, or some other composition. A peach tree very speedily recovers from such wounds.

Lime or ashes laid close round the tree is an excellent preventive of the worm; and if the lime has become mild, or the ashes leached, one or two shovelfuls may be very safely applied. Quick lime, especially hot lime, or unleached ashes, however, may require to be given in smaller quantities.

The advantages of such applications appear to be that the grass is destroyed, and consequently the bark is harder down to the very surface of the lime or ashes,—near which the mother insect is more unwilling to deposit her eggs.

A few words in regard to pruning. As soon as the peach trees show symptoms of being stunted by bearing,—amputate, and encourage the growth of young vigorous branches. The fruit on such is often as fine as the fruit of a young tree.

BLOODY MILK—INQUIRY.

From the Cultivator.

"Gentlemen—I should be glad to obtain a remedy for a disease in the udder of cows like the following: On Sunday evening I discovered that bloody milk was drawn from one teat, accompanied with a slight swelling behind it. On Monday morning one-half of the udder was so badly swollen as to render it nearly impossible to milk the two teats affected; the other two teats remained unaffected. It has continued until this time, (Saturday;) there is no appearance of external injury; though I should state that some time previous to my purchasing her, three months since, she had had a back rib broken.

"M. R. GRISWOLD.

"Middletown, Ct., 1840."

Bloody milk may be occasioned by external injuries; by garget, in which case it is usually combined with swelling, and the discharge of stringy matter; or by pressing the udder or teat in milking so unskillfully as to rupture some of the fine blood vessels within, and cause the blood to be discharged with the milk. When it arises from garget, the best remedy we have known used, is to cut the scoke, or garget root, as it is sometimes called, into fine pieces, and feed a handful or two to the cow with a mess of bran or cut vegetables. Where the bleeding arises from external injuries, or a rupture of vessels, washing the bag or udder, by preventing inflammation, will produce a good effect. Salt and water has been recommended for this purpose. Giving bloody milk is, however, at times a fault from which a cow cannot be freed, and that part of her udder must be lost, or the animal fed for the butcher.

"MILKING."

From the Cultivator.

Messrs. Gaylord & Tucker—In answer to Mr. Freeman, your Indiana correspondent, who asks, "Is there any remedy to keep a cow from holding up her milk?" I beg leave to say, I think there is a very simple and sure remedy. I have for many years occasionally used it, and have in no instance known it to fail. When a calf, I noticed, with surprise, that a calf, when beginning to suck, would frequently change from one teat to another, and butt with considerable force the udder of its dam; and I inquired of a person near me, why the calf did this? The answer I received was, "to make the cow give down her milk." This answer was undoubtedly correct. Since then, when milking, and the cow retained her milk, by imitating with my hand, this action of the calf, she would immediately cease to withhold it, and the milk would flow freely.

In every instance that has fallen under my observation of a cow's retaining her milk, I have noticed circumstances that convinced me that it was not wholly an involuntary act; as for instance, the strong contraction of the abominable muscles, and her ceasing to chew the cud. Under these circumstances, by imitating with the hand the butting of the calf, the careful observer will not fail to notice an immediate relaxation of these muscles; and when the milk is permitted by the cow to flow unrestrained, she will rarely fail to immediately recommence the chewing her cud.

These hints are intended merely as a supplement to the directions you have appended to Mr. Freeman's communication, which should never be neglected; and should any one fail to treat with deserved gentleness and kindness, that most useful animal the cow, the better part of your readers would not be anxious to lavish their sympathy upon him, should he, in return, fail to receive the rich reward due only to the deserving.

I am respectfully yours,
N. IVES.

Wallingford, Vt., Sept. 10, 1840.

RULES FOR BREEDING.

From the Farmer's Gazette.

What follows may appear to be dreaminess, to unprofound intellects, who have not studied physiology. It is an epitome, *mainly*, of Mr. Walker's new views of organization. Yet mankind had discovered, previous to Mr. Walker's publication, that they possessed the power of amelioration, and that of deterioration, of their own organization, in their offspring. They knew that organic laws like their own existed in domestic animals. What all these laws were, in either case as regards generation, was unknown, previous to Mr. Walker's publication. This book gives a much more nice rule, or rules, for breeding offspring, than has hitherto existed; and will, without doubt, be soon applied to breeding profitably domestic animals, if not to breeding men. Profitableness, from the last act alluded to, may be too remote to excite attention. The newly discovered law can be applied to use, by unphilosophical persons, like the mariner's compass, or the thermometer.

The organic law, or laws, to regulate our conduct are as follows:

1. Animal organization grows, from two parents in two, somewhat, unsymmetrical halves; and each part has mostly the properties of the parent from which it is derived, notwithstanding the nutritious blood, which circulates through both halves. Atavism and freaks of organization may change this tendency of growth, somewhat, in some few cases. Organization is indestructible, save by the death of the whole, or a part of it, and is continued in posterity. Its growth, however, is so modified, as to occasion an amalgamation, or suitable joining of the two halves during life. And the blood moving through both halves makes children of the same parents resemble each other.

2. The most excitable parent, for the time being, always gives, for future growth, *the vital viscera within the whole trunk, and likewise the intellectual part of the brain, which grows within the forehead*. The less ardent parent, on the other hand, gives matter for the growth of the bones, *the locomotive organization, the back head, limbs and moveable parts of the face*. Parental seed grows, during the life of offspring, into the likeness of the parent, from which it came. And so on, ad infinitum.

3. The female is generally, *yet not always*, the most ardent, for anatomical reasons. The passionateness in either sex may be increased by previous unindulgence. Hence if good intellects and sound viscera are wanted, in most men, in many cattle, in hogs, in some sheep, females should be the best, and in vigorous health; while in horses, camels, elephants and in some men, where speed and muscular strength is mostly wanted, the male should be the best; unless the conclusion be that both male and female be equally good, or the best of their kind, and of nearly equal and suitable age; in which case there can be little chance for disappointment, unless there be *quasi identity* of organization, as that of pernicious "in and in breeding."

4. The above are golden rules or problems; yet some unlikeness is wanted. Hence the utility of properly crossing of breeds in the same race. Amateness cannot exist without dissimilarity of organization. The faculty of propagation fails, from too much likeness, as it does from too much age.

5. Let it always be borne in mind, that it is the resemblance, as regards the configuration of any organization, much more than that of its size, or structure, which enables any one to perceive which parts have been derived from a given parent. Prominent cases may be needed for beginners, in this science under review. The size and structure of a part varies with the age of its growth, more than is the case as regards form. Besides, to know structure dissection is needed. It is a general mental law to identify, on the one hand, the species of organization by its shape, and on the other hand, its age by its size.

6. Walker's science was much wanted to finish that of Dr. Gall, or what may be viewed as pertaining to phrenology. The pen is stopped, because it is presumed, that no one will act upon Mr. Walker's plan without studying his book attentively. It has some errors without doubt; and it may too often attempt to explain what is beyond the ken of useful philosophy. We have not

minds given us to penetrate the *modus operandi* of growth. Nor can we penetrate, otherwise than by conjecture, what may have been the laws of nature, previous to the era of history and science. The object is to turn the attention of newspaper readers to Mr. Walker's book on Inter-marriages.

CULTURE OF THE STRAWBERRY.

From the Cultivator.

Messrs. Gaylord and Tucker.—In my last I promised to give you my plan of cultivating the strawberry, which having succeeded for seven or eight years, producing a full supply of fruit, with much less labor, is, I conceive, worthy of being made public. The duration of a bed cultivated after my plan, is also a matter of great consequence.

I have never grown any of the choicest varieties except Keene's seedling, nor have produced fruit so large as I have seen figured or described, but as to the amount produced on a given space, I think I can compete with the most fortunate or skillful.

For soil I choose that between the extremes of dry and moist, a little gravelly I prefer, which I prepare by mixing well rotted leaves, rotten wood and cow yard manure in about equal quantities, which I have well mixed with the soil, by spading or ploughing in deep, if with the plough, some two or three times. I then level the ground, but do not raise it above the walks, so that it will receive and retain all the water which falls upon it. Thus prepared, I proceed with my plantation, either in autumn or spring. The former is preferable, provided the weather is favorable for transplanting in August or September, so that the young plants can take root sufficient to endure the winter. In planting I arrange my beds about six feet wide, putting in the plants about a foot asunder each way. At or near the approach of winter, I give a slight covering of tan bark, say the first year, the second of wet or rotting leaves, and the third of some light mould or well rotted manure, and so on alternately. The tan or leaves are best the first year, as either of them better protects the plants. If the plantation was made in autumn, by the next July or August the whole surface should be well covered with the vines, which will spring up through the top-dressing without difficulty; at which time I pass through the plantation with a spade, cutting through, say lengthwise about one spit wide, and turning under the plants, then leaving about the same width, and so on alternately through the whole bed. Top-dress as above for the winter, and next spring, as soon as the frost is out and the ground sufficiently dry to leave the earth or soil light and mellow, I cut through the bed crosswise with the spade in the same manner as before. If the plantation was made in the spring, the first spading should be performed the next spring, and so on semi-annually from year to year. In an old bed I take care to turn under the old plants, so as always to keep up a succession of new and vigorous plants—I never disturb the manures, and do not know but the best time to perform the second spading of the season would be immediately after gathering the fruit, so as to give the runners a light open soil to take

root in. From the success I have met with by this process, I am inclined to think that a bed or plantation will last twenty years, or perhaps even a century—I had a bed seven years old, in a garden I abandoned, without any care last spring or even last year after the March working, which produced its usual quantity of fruit this season.

During the blooming season, unless in wet weather, I always give a slight watering from a pot every evening to set the fruit. This must never be omitted if fruit be an object.

Another circumstance must not be overlooked, that you have bearing or fertile plants. A little observation or skill on the part of the cultivator will enable him to distinguish the barren from the fertile plants, from the large, showy flowers, with long stamens, red or black anthers of the former, while the latter are almost destitute of stamens or anthers, and the petals of the flowers are very small. It is said to be necessary to plant both kinds together in order to success. Of the truth of this I have some doubts, but I have not experienced sufficiently on the matter to determine.

As to the produce, I believe, without difficulty, by my plan of culture I can grow *one hundred and sixty bushels* of this delicious fruit to the acre, per annum, or one bushel to every square rod. Indeed, I have by actual measurement greatly exceeded this.

I. DILLE.

THE ICE MOUNTAIN OF HAMPSHIRE, VA.

From Kercheval's History of the Valley.

This most extraordinary and wonderful work of God's creation certainly deserves the highest rank in the history of the natural curiosities of our country. This mountain is washed at its western base by the North river, a branch of the Capon. It is not more than one quarter of a mile north of the residence of Christopher Heiskell, esq., at North river mills, in the county of Hampshire, 26 miles north-west of Winchester. The west side of this mountain for about one mile is covered with loose stones of various size, many of which are of a diamond shape. It is probably 600 or 700 feet high, very steep, and presents to the eye a most grand and sublime spectacle.

At the base of the mountain, on the western side, for a distance of about one hundred yards, and ascending some 25 or 80 feet, on removing the loose stone, which is easily done with a small prize, the most perfectly pure and crystal looking ice, at all seasons of the year, is to be found, in blocks of from one or two pounds to fifteen or twenty in weight. At the base of this bed of ice a beautiful spring of pure water is discharged, which is by many degrees colder than any natural spring water the author has ever seen. It is believed that its natural temperature is not many degrees above the freezing point. Very near this spring the owner of the property has removed the stone, and erected a small log dairy, for the preservation of his milk, butter and fresh meats. When the author saw this little building, which was late in the month of April, the openings between the logs, (on the side next the cavity from which the stone had been taken out,) for eighteen inches or two feet from the floor, were completely filled with ice, and about one half the floor was

covered with ice several inches thick. This is the more remarkable from its being a known fact that the sun shines with all its force from eight or nine o'clock in the morning until late in the evening, on the surface covering the ice, but the latter defies its power. Mr. Deevers, who is the owner of the property, informed the author that milk, butter, or fresh meats of every kind, are perfectly safe from injury for almost any length of time in the hottest weather. If a fly venture in, he is immediately stiffened with the cold, and becomes torpid. If a snake in his rambles happens to pass over the rocks covering the ice, he soon loses all motion, and dies. Christopher Heiskell, esq., informed the author that several instances had occurred of the snakes being found dead among the rocks covering the ice. An intelligent young lady at the same time stated that she had seen instances of this character. In truth, it was upon her first suggesting the fact, that the author was led to make inquiry of Mr. Heiskell. And Mr. Deevers stated that he had several times removed torpid flies from his dairy into a more temperate atmosphere, when they soon recovered life and motion, and flew off.

Nature certainly never formed a better situation for a fine dairy establishment. But it will probably be asked by some persons, where is the milk to come from to furnish it? The time will probably come, and perhaps is not very distant, when our mountains will be turned to good account. Their sources of wealth are not yet known; but the spirit of enterprise and industry is abroad, and the present generation will hardly pass away before the most astonishing changes will be seen in every part of our happy country.

ON THE USE AND VALUE OF LIQUID MANURE.

From the Mark Lane Express.

I was first attracted to the value of liquid manure when on a visit to Baron Biel, in Germany, (the Sir Charles Bunbury of that country,) by seeing two carts constantly at work on his land, carrying out the liquid drained from a large number of cattle feeding on the refuse of wheat, from which brandy had been distilled; and by hearing from himself the great benefit his land had obtained from the use of it. Immediately on my return home, I put his plan into execution on a small scale, in the following manner. I had a well sunk as deep as I thought was necessary to receive the drainings of a yard, in which about twenty horned cattle, as many pigs and seven cart horses (besides colts and calves) were kept; having rather a fine grating at the mouth of the drain where it emptied itself into the well. A wooden pump was put into the well, which raised the liquid into the cart with very trifling labor by the addition of a conducting spout, and I am not aware of ever having seen obstruction from filth, as your correspondent complains of in this simple operation; neither was my well cleaned out for the space of several years. The machine for carrying this liquid to the land was of this description. I first purchased the fore axle-tree and wheels of an old bread wheeled wagon. I then had a water cart made, exactly on the principle of those used to water roads, which it requires two horses to draw

when full. The expenses of the well (which was bricked,) the axle-tree and wheels, and the body cart, as near as I can recollect, twenty-two pounds. And now for the effect. This will be best shown in one single instance. I had a meadow of six acres, so much out of condition that the laborers absolutely refused cutting one year. By the application of this liquid, alone, it was, *the next year but one*, as good as any other on the farm. It told equally on other grass land, and I would have used it on my other farm, had the locality of the buildings been convenient for securing the draining from the stalls, stables, &c. I never applied it to ploughed lands, having always an abundance of yard manure from horses summered in the stable, besides other regular sources; but the bailiff of the late Mr. Chate, of the Vine, (master of the Vine foxhounds,) who followed my example, did apply it to his hops, and occasionally to naked fallows with very good success.

As to the test of its strength, which your correspondent inquires about, I had no means of obtaining it; but I considered it to be strongest when darkest in color, and smelling very strong of the stalls also in dry weather; and I like to see a scum on the top of the well showing that a degree of fermentation was going on.

NIMROD.

St. Pierre, near Calais, Jan. 28th, 1840.

TO DESTROY THE STRIPED BUG.

From the Cultivator.

Mr. Wm. Youngs of Lyons, informs us of a more feasible method of destroying the striped bug which infests melons, cucumbers, &c., than that described by Mr. Wilson in the last Cultivator. It is to place a turkey, with her brood of young, in a coop in the garden, just as the plants appear above ground. The young ones will live on the bugs, which they eat with great avidity; but the old one in the coop must be fed her usual meals. The turkeys must, after destroying the bugs, be removed from the garden before they become so old as to prey upon the setting fruit.

THE DISPOSITION TO FATTEN OF DIFFERENT BREEDS OF HOGS.

From the Western Farmer.

To be able to decide, as nearly as possible, what particular kind of hog, of all those imported into this country from other countries, as well as the productions of these by crossing them with one another, has the readiest disposition to fatten, is a point of very great importance and interest. Although we have not, at present, any statements from agriculturists and stock raisers in the western country upon this particular point in hogs, yet we have from foreign sources, and from other parts of the country, some data upon which to found a few pretty certain conclusions on this subject: and until we have further information in this matter, from those farmers who may be curious and patriotic enough to make the necessary experiments, we will content ourselves in laying before our readers all our knowledge derived from foreign

trials of this kind, and from some acquaintance we have had with swine in England. In the first place it is hardly necessary to mention that the Chinese hog has been always distinguished above all other breeds by its peculiar aptitude to lay on fat; but owing to its being but a poor breeder, the pure breed is but little cultivated. Of this breed there are two nearly distinct kinds, the *white* and the *black*. There is also a *mixed breed* of this kind, being spotted and mixed black and white; some of them have prick ears, like the true breed, and others have ears round at the ends, and hanging downwards. These are coarser than the former, but they, unlike them, are remarkably prolific, are good nurses, and will, with proper care, bring up two litters within the year. They are, however, not good store pigs, rarely attaining any great weight, and much more difficult to fatten than the original stock of the Chinese breed.

The next in order of fattening propensities, after the true China breed, either white or black, seems to be the *Woburn* or *Bedford* breed, a new variety introduced by the Duke of Bedford. They are of various colors, well formed, hardy, very prolific, and have attained to nearly twice the weight of all other hogs, except the Chinese and Berkshire, within the same given period of time—and even the Berkshire they have surpassed to some not inconsiderable amount. Then, as almost universally admitted, follow the *Berkshire*, too well known to require description. These crossed with the Chinese have produced a race possessing some excellent fattening and other good qualities, and are known in England as the *Tonkey* breed. The *Berkshires* are dispersed over the whole of England, and have therefore varied both in form and color; but the best are in the neighborhood of Tamworth, in Staffordshire, from the famous *Tamworth Boar*. The crosses also from this breed are very numerous in England, and are highly rated in their different districts. After the Berkshire in kindliness of fattening, must be rated the *Essex half black* pigs, raised by Mr. Western, of Felix hall. They are short haired, fine skinned, smaller head and ears than the *Berkshires*; short snubby noses, very fine bone, broad and deep in the belly, and full in the hind quarters; the sows are good breeders, but they are not near such good nurses as the *Berkshires*. The *Lincolnshire* rank next, and in point of profit are hardly less than the *Essex*. They are white, and rather tender. This breed is much the same as the *Norfolk* and *Suffolk*. The *Sussex* breed is smaller than the *Berkshire*. It is a variety of the *Essex*, and is a very valuable kind of hog. It may be classed next in order for fattening properties, and what is deserving of notice, arrives at maturity sooner than any other kind. The *Hampshire* fatten kindly to a very great size and weight. The *Northampton*, *Shropshire* and *Yorkshire*, are of large size, but fatten more slowly. The *Cheshire* are the largest hogs except the *Rudgwick*, which is the largest in the kingdom of Great Britain. The *Essex* and *Hertford* breed, as it is called, has taken premiums from the London and Smithfield cattle club, and is held in high estimation. We then classify the different breeds for fattening propensities (until we are further informed by sufficient comparative experiments) in the following order:—

1. The Chinese.

2. The Woburn, or Bedford.

3. The Berkshire.

4. The Essex half black.

5. The Lincolnshire, &c. &c.

We ought not to omit to mention that the Neapolitan stock of swine have a very great aptitude to fatten. In the meanwhile we copy from the Franklin Farmer, the following interesting letter from Samuel D. Martin, Esq., of Kentucky, on this subject, and it would seem that as far as his friend's experiments have gone, the Woburn breed of hogs, as we have stated, stand pre-eminent in that most valuable characteristic—quickness in taking on flesh.

A proposition to test the relative disposition to fatten, of different breeds of hogs.

The hogs raised and fattened in Kentucky, it is believed, amount to more than two millions of dollars annually, and consume in the raising and fattening more than a million of bushels of corn, besides rye, oats, wheat, and grass.

It would be of great value to the state to have such experiments made as will test the value of the different breeds, and ascertain which is the best machine for turning our surplus grain into meat.

Some hogs will make double the quantity of meat out of a given measure of corn that will be made by others. Therefore it must be very plain, that the persons feeding bad breeds must suffer considerable loss. No man should keep a bad breed when he can get a better. But it is to be regretted that sufficient experiments have not been made, to determine clearly which is the best breed.

I have made some experiments between the two most valuable breeds that I have, but they were not conducted so as to be clearly satisfactory. I put two *Berkshires* and two *Woburns* into the same pen, and fed them together. The experiment resulted in favor of the *Woburns*. But they were all fed in the same trough, nor do I know what was consumed by each.

In a trial lately made by William and Isaac Barclay, of Jessamine, between two boars, the *Woburn* gained fifty pounds more in thirty days than the *Berkshire*. But here again we have no account of what each consumed. The trial was made for the reputation of the stock, and it is presumed that both had as much as they would eat.

For the purpose of making a set of experiments that will be satisfactory, I would propose to the advocates of other breeds, to furnish *Woburn* hogs or pigs, barrow or sow, to be fed by some disinterested person, in such a way as to ascertain which will come earliest to maturity, fatten easiest, consume the least food, and travel best to market.

I would propose that two or three pigs be fed upon a certain allowance, and that the balance shall have as much as they will eat. That they be kept in separate stalls, and an exact account be kept of what is consumed by each one. To be kept in this way until they are ready for market, and one of each kind be sent to our most distant market, weighed at starting, at the journey's end, and after they are dressed. The balance to be sent to our nearest market, weighed before starting, and upon reaching the place have their gross and neat weights ascertained.

If my proposition should be accepted, each person to pay the proportion of the expense of the experiment.

If the above proposition is not accepted, I will feed a Woburn barrow, sow, or pig, against any other hog in the state that has no Woburn blood in it.

No proposition that has any thing like a bet or wager attached to it will be accepted by me, but I wish to feed to ascertain what the different kind of hogs will do.

S. D. MARTIN.

BONES AS MANURE.

From the Quarterly Journal of Agriculture.

Mr. Watson procured bone manure for two acres of land, the greatest quantity being 25 bushels per Scotch acre. "This," says he, "I applied the following turnip-sowing season on a sharp black land, and on two adjoining acres of the same field, I applied 25 cart-loads of well-made farm-yard dung per acre: the season of sowing was rather wet, and not very favorable to the growth of turnips. Those with bones came above ground on the third day, very dark-colored and broad in the leaf, and by the tenth day they were all in the rough blade; at this time I examined the state of the bone manure, and found it in one mass of maggots; but two days after, they were all dead, and the weather being now dry and warm, the most rapid vegetation I ever remarked took place, so that by the fifteenth day from the time of sowing, the turnips were fully strong for being thinned. The plants where the farm-yard dung was applied, did not come up until the fifth day, and the turnips were twenty days sown before they were fit for thinning, and by this time the bone turnips were meeting on the top of the drill, and they continued to maintain the advantage of their first start, until the month of September, which set in rather dry. At this time I anticipated that the bones would be exhausted, and the crop stop growing, but such was not the case, for while the dunged crop began to fade and stop growing, the bone turnips kept growing vigorously. About the middle of October, when I considered both crops at maturity, I had a comparative trial of their weight carefully made, the result of which was, six tons per acre in favor of the bones, they being twenty-eight tons per acre of Aberdeen yellow turnip; the farm-yard dung, only twenty-two tons per acre.

From this experiment, I was induced to extend the use of bones on my farms, growing annually from 70 to 100 acres of turnips, with this manure, which gives me a great command of dung for my other crops. I have erected machinery for grinding bones, my neighbors having now all become convinced of their great superiority, and the first season I sold to the amount of £1500 sterling worth, and the last season not less than £10,000 sterling has been paid for bones used in the district of Strathmore, a great part coming from Hull.

The quantity of bone manure may be varied from 15 to 25 bushels of dust per acre, according to the state of the land, the driest soils being the most benefited by their use; some difficulty was at first experienced in depositing the crushed bones, so that the plants might reap all the benefit; but

this is now obviated by the application of a hopper and trough to the turnip-drill, which conducts the manure and seed into the drill at the same time, and with the same expedition as sowing the seed by the old machine.

Doubts had been raised whether the succeeding crop of oats or barley is in any degree benefited by the small quantity of bones used in growing a crop of turnips. I can confidently state that, on my farms, both the quantity and quality of my barley particularly have been improved, and the grass from seeds sown with it is a fortnight earlier in its growth than after other manures.

In the crop of 1825, the bone manure was a great blessing to the breeders and feeders of cattle in this district, and, in some instances, saved the industrious tenant from ruin; for the severe drought, even of that season, did not prevent a crop of turnips with bones, while all other manures failed, and it was thus the means of bringing through that disastrous winter, herds of cattle which must otherwise have perished for want of fodder.

IMPORTANCE OF MANURE. KLIYOGG THE SWISS FARMER.

From the Farmers' Cabinet.

Sir—A friend has put into my hands a book, recording the history of a remarkable individual, a Swiss farmer, by the name of Kliyogg: it was published forty years ago, but it contains instruction and information, with food for reflection, which will be ever new and of the highest interest to every practical agriculturist; and I therefore feel a great desire to copy a part of the first chapter, "on the value and importance of manure," which will, I conceive, be read by a very great portion of your subscribers to much advantage, and be the means of leading us all to reflect, how little of the value and importance of that chief agent in agriculture is yet known or cared for.

Kliyogg's family consisted of a wife, a brother and his wife, and their two families of *eleven children*, all, except one daughter, mere infants. His farm, of eighty-four acres of cleared land, was so poor that it would support but three oxen, four cows, one horse, and two hogs—in all, but ten head of live-stock—but, from this wretched little impoverished spot, he contrived to procure the means of subsistence for such a numerous *colony*, and eventually *riches*—but here commences the chapter "on the importance of manure."

"It is not from grazing, therefore, that Kliyogg expects advantage, but from an article of more advantage, and more to be depended upon, *the increase of dung for manure*. He finds his horse more expensive than serviceable, and determines to sell him and buy oxen with the money, as he computes that two oxen may be maintained for one horse. The advantages which he derives from his cattle are, milk, butter, work and manure; the last article, *manure*, he considers as the basis of the improvement of the soil; consequently, he has applied the whole force of his care and industry towards its accumulation, and has so well succeeded, that from his small number of cattle, he collects yearly about a hundred loads,

which is double the quantity which he collected the first year of his farming; and this has led him to conclude, *that the generality of farmers have too great a proportion of live-stock to their land!*

This conclusion appeared to me, at first, very extraordinary, and almost tempted me to consider him a man of paradox; but his explication of this enigma satisfied and undeceived me, for, said he, "when a farm is overstocked, the owner is forced to send his cattle, in the summer months, to graze on waste lands, at a distance from his house and their sheds, which is the loss of so much to the farm-yard; for as the poverty of these waste lands reduces their milk, to remedy this defect, the manger must be filled with fresh grass, when they are brought home at night, which necessarily diminishes their winter store of provision; scarcity of hay must imply a call for straw, which ought to be entirely appropriated to the dung-hill, as, without it, no improvement of soil can be expected; and besides which, bad food is the source of an infinite variety of distempers." And in this way he pointed out most judiciously a principal cause of deficiency in the agriculture of the country; for it is a fact, that many of our farmers keep more cattle in the summer than they can conveniently support in the winter; the arable and meadow lands are, by this bad management, deprived of that part of the manure which they require: the cattle, enfeebled for want of wholesome nourishment, particularly towards the spring, lose their milk or their laboring strength, and frequently die of diseases easily accounted for; and these are truths, which *experience* too well evinces. He therefore keeps no more live stock than he can amply support with grass and hay from his own fields; the straw is carefully preserved and used only for litter, of which he is so liberal in his stalls, that the beasts are buried with it to the knees. He is attentive also to gather all the dried leaves, moss, rushes, &c., from his land, that can in any way serve for litter; the small dead boughs and pointed leaves of fir-trees in particular, afford plentiful materials for this purpose, and he employs in this occupation the greater part of the time he can spare from his other work.

A compost dunghill appears to him an object of so great importance to the improvement of land, that of all branches of labor he regrets the want of assistance in this the most, and waits, as a singular blessing, the time when his children shall be capable of contributing their share; for so thoroughly is he persuaded that he wants only laboring hands to procure *fifty loads more of manure, without increasing the number of his cattle!** In prosecution of this *great design*, he goes in the autumn into the woods with a hedge-bill, or hook, to prune the supernumerary branches of fir and pine trees; even of those which he thinks it useful to leave, boldly venturing to cut the lower shoots of the young trees close to the trunk; these he binds into fagots and carries home, placing them under a shed, till a proper season for prosecuting his work; and at leisure hours, and especially in long winter evenings, he prepares these fagots for the purpose intended, an employment so

little disagreeable or fatiguing, that it serves him for recreation. He begins by cutting the small branches away from the larger ones, laying them, with the pointed leaves of these trees, in little heaps, to be used for litter, while the larger and tougher boughs are reserved for fuel; by this method he *amasses* many proper materials for good manure, that are commonly suffered to rot uselessly in the woods, which is so much real loss to husbandry! *To Klyogg this discovery is an inestimable treasure*, of which we were either ignorant or forgetful; and this opinion is farther verified in the husbandry of the canton of Appenzell, where they scatter dead branches of fir and pine trees in great roads, to be trampled upon by cattle and passengers, by which means they acquire a beginning of putrefaction, and are converted into manure, though, it must be confessed, of a very indifferent quality; but Klyogg, who had experienced how defective this method was, has succeeded in what at first seemed hard to accomplish, namely, converting these very materials into excellent manure. And although it is known that resinous and aromatic juices, contained in the prickly leaves of pines, are powerful enemies to putrefaction, yet, what obstacles are not to be surmounted by reason, aided by industry! He subdued them all, by observing certain rules in the preparation of litter for his cattle, *and of the different strata of his dunghill*. He does not remove the dung from under his cattle under a week, strewing fresh litter upon the top every day; this method he does not find injurious to the health of his cattle, nor does he think it prevents cleanliness, if a constant supply of fresh litter be added. His exactness is conspicuous in the management of this litter when taken away, for it is placed in separate layers upon the dung-hill, and so methodised, that those where the fermentation is soonest to be expected, may accelerate the putrefaction of others where it is more slow; he therefore, in the beginning of autumn, litters his cattle with straw during two months; the next two months he litters them with twigs and spines, or pointed leaves, from fir and pine trees; then straw again, or rushes or dried leaves; then twigs, spines, and so on alternately.

The regulation of his compost dung-hill is as follows. Lest the fermentation should be totally suppressed, or even checked by drought, he is assiduously attentive to the preservation of a certain degree of moisture, knowing that to obtain a manure thoroughly rotted, he has nothing to do but to preserve a constant fermentation by frequent waterings; and to facilitate this, he has sunk, near his dunghill, seven large square pits, which are planked with wood in the form of boxes, and in these he keeps the *prolific* water essential to so many operations; first, putting some thoroughly fermented cow-dung at the bottom of his boxes, he pours in a pretty considerable quantity of *boiling water*, and then fills up the pit with fresh water from his well; this brings on, in three weeks, a state of putrescence, which, without boiling water, could not be attained in two months; he has thus a supply of corrupted water, as well for the purposes of vegetation as to keep his dung-hill in a constant state of humidity. His reservoirs of stagnant water are sunk below his stalls and stables, with the view to convenience, and there is likewise a trough at the declivity of the dung-hill, to

* Will our Jersey friends, residing in the midst of the inexhaustible marl-beds of that highly favored region, reflect on these things: *fifty loads additional in the course of the year!!*

receive the water that runs from it, and this gives an easy opportunity of moistening the dung-hill frequently, without robbing the soil of its share of the stagnant water. And the success of this method of watering his dung-hill suggested the idea of putrefying small twigs of fir and pine, without using them for litter; he lays them in close heaps, pressed down and covered with earth, to prevent evaporation, and pours stagnant water upon them every day, until they are converted into *rich mould*! But he does not bound his improvements within the circle of that quantity of manure, which his industry procures from his small number of cattle, *for he buys every year seven loads of dung from his neighbors!* and these he mixes with six tons of peat ashes; and he finds the effect of these two kinds of manure answerable to his expectations."

Now, how strangely will it appear to many of your readers, who witness daily and hourly the waste of thousands of loads of the finest manure, in the washing from cattle-yards; the rich soils which might be obtained from river and roadsides; the cleanings of ponds; the openings of pits and quarries; and more especially, the waste of winter-bedding, in the shape of stubbles from the different crops, which are often left standing in the fields knee-deep, because of the weeds or grass contained in them, which ought to be sacrificed, rather than lose a foot in height of the stubbles and cords of dung in the cattle-yards! How strange will it appear to such, I say, to hear a man regretting that he is deprived, by the want of assistance from his young and helpless family, of making an additional *fifty loads* of compost in the course of the year! and rejoicing in the *inestimable treasure* contained in the spikes and leaves and branches of his pine trees, which he trains up by candle-light in winter evenings, by way of *recreation*! And after the *inestimable treasure* which he obtains from this source of his *discovery*, to find him *absolutely* a purchaser of manure, to the amount of *seven loads* per annum, of his neighbors! If the perusal of the above history will not move us to be up and doing, in the way of collecting the means of improvement contained in the mines of wealth with which, in this country, we are surrounded, and in some situations *absolutely choked with*—witness our ponds and ditches around many of our cattle-yards—I know not what will ever be sufficient to *move* us, until we are moved off the stage of life by the rising generation, which seems to be springing up for the purpose of correcting the errors of their fathers, more particularly in this respect than in any other; for it must be admitted that there is too much truth in the observation, "to the young it is that we are to look for improvement."

STEPHEN GIBSON.

ERADICATION OF WEEDS.

From the Farmers' Cabinet.

Sir,—You have been adding line upon line, and precept upon precept, in the pages of the Cabinet, on the necessity of keeping crops free from weeds, showing that the land *will* produce a crop of *something*, depending, however, upon the will of the owner what that shall be, whether of thistles, rag-weed, corn or grain; and I cannot but call the attention of my fellow-readers to the consider-

ation of a subject of the highest importance, but which seems least of all to have obtained the care of the husbandman generally. The truth of the above is strongly exemplified in the present state of the crops of multicaulis, wherever they have been neglected and left to shift for themselves, which has been very much the case in this, the day of their humiliation, throughout the country. All will remember the encomiums which were lavished upon this crop, even so late as the past season; that they would "flourish *any* where, and under *any* circumstances," was a part only of their peculiar properties, but their present appearance convinces us that they depend, in a very great measure indeed, for their good looks and abundant foliage, upon good food and superior cultivation, for wherever this has been withheld, their state is wretched in the extreme. I saw, yesterday, an acre of these trees, which had been planted in the spring, and have never since been cleaned; the result is, the weeds are taller and stronger than they, and a thousand times more abundant, with bushels of seeds, ready to shed and sow the land for seven years to come, while the foliage of the morus, instead of being of that large growth and deep green hue, is small and mean, and the color of a peach tree in the yellows—no longer fit for *pies* or *tobacco*!

This is a lesson which ought not to be lost upon us; it furnishes a means of calculating the value of clean cultivation; and without such ocular demonstration, few of us would have been able to form an estimate of the vast difference, which really exists. I declare for myself, that I have never before seen the evil of neglected cultivation in the light that I now do, nor can I believe that my neighbors understand, even at the present time—with a crop of weeds five feet in height, and of proportionate substance—to what a degree they are robbing their crops of their proper nutriment! And if it be true, as has been often said, that a "single root of grass amongst wheat has been found to draw a portion of the nourishment from *six* plants of the wheat," it is only to be wondered, that some crops continue to get any at all, when buried beneath a covering of them as high, oftentimes, as the fences!

Adjoining the field containing the multicaulis trees, and upon exactly the same quality of land, is a large breadth of sugar-beet of remarkable size and most luxuriant growth, but they were planted in rows at a proper distance, and have been kept perfectly clean; and while the morus has *turned to a crop of weeds*, here the crop is *beets*, which will give from fifty to sixty tons per acre! Now, to have converted these into a crop of weeds, it would only have been necessary to permit *them* to take possession of the soil and keep it, and the end would have been accomplished. As it is, it does one good to calculate the quantity and value of the manure which this crop will yield on being fed the coming winter—far greater than the whole expense of raising the crop—to say nothing of their value as food for stock during that trying period! It is quite unnecessary to add that the person who owns this crop is not the owner of the morus; his crops are uniformly large and heavy, *because* they are kept clean from weeds.

It is calculated, and I believe the estimate is far too low, that a heavy crop of weeds consumes at least one-half the dung that is applied in pre-

paration for a crop of grain—how pleasant it is, then, to reflect that while I am carrying manure to my four-acre field a mile off, one-half my dung and labor goes to support the weeds, and one-half the remainder is lost in the diminution of the crop in quantity and quality, or thereabout; this is tithing the crop with a vengeance, and would never be submitted to, did not farmers believe that crops "won't pay for cleaning!" But, if this were the fact, what a losing concern must be the growing of a corn crop which is so expensive in every stage of its growth! and yet, none of us hesitate to perform it, or are afraid to debit the crop with the cost, which it is always sure to pay, if the season is favorable. Is it not, therefore, passing strange, that any one should be so perverse as not to see, that if corn will pay for superior cultivation all other crops *must*, and especially potatoes, a crop that is generally devoted to the weeds at some period of its growth, although none perhaps suffer more from their presence, particularly in quality; and this remark is exemplified in a crop of these, which is now growing in an adjoining field, where my neighbor Dale gave up the cleaning for a bad job, when he had got through about half the piece; they were of an early variety, and he is now taking them up, but it is really a caution to see the difference which there is between the upper and the lower ends of the patch; they appear upon the part which was allowed to go to weeds, of quite another kind, even in their form; worm-eaten, scabby, and covered with tubercles; and, on boiling, are watery, comparatively fit only as food for hogs, and about half the size of those upon the cleared land. Now it must not be forgotten that there is a *small condition*, appended to the promise, "in due time ye shall reap," it is, "if ye faint not." My neighbor fainted at half-way in his war upon the weeds, and his crop of potatoes became a crop of weeds, so thick and high, that he was compelled to mow them with a scythe, before he could see where to put in the space, the very rows being obliterated; and the crop in quantity is equally deficient. On my reminding him of the common observation, "crops won't pay for cleaning," I was pleased to hear him say, "I'm now satisfied they won't pay for neglecting, any how."

But I owe honorable mention of the management of the person who owns the sugar-beet above noticed. Nothing is so common as to see the headlands of the corn-crop full of the largest and stoutest weeds, no care being taken to clean them, even by mowing, after the last cleaning of the crop; now here is an exception to this almost universal practice, for, at that time, he turned about and ploughed them down, and sowed the land with buckwheat; and the view at this time is absolutely lovely, the plant in full bloom, and remarkably strong and vigorous—for every one knows that the headlands are always the richest portions of the field—and promise a crop sufficient for the support of the farm household during the coming year. No fear of this man's crops turning to weeds, but it is quite amazing to see the fine crops of these, which are repaying his neighbor's care of them, to the value of cent. per cent. R.

September 16th.

VOL. VIII.—85

TRENCHING.

From the Farmers' Cabinet.

Sir,—The best managers are always to be found in the most unfriendly soils and situations—witness our friends in the eastern states, the *Scotland of America*—so true is it, that "In countries where nature has been bountiful, man has been indolent, where she has been niggardly in her gifts, the deficiency has been more than compensated by the industry of man."

In the "Survey of Aberdeen," there is the most surprising account of what has been done in the way of trenching their soil in the neighborhood of the town of Aberdeen, and which does indeed go to prove the truth of the above observation! It is remarked, "The greater part of the land in this vicinity has, from the most barren and unproductive state, been thoroughly improved by trenching: not less than three thousand acres have been trenched within three miles of Aberdeen, and in all places of the county considerable additions have been made to the arable, by trenching the barren lands. It is practised on land which abounds in stones of different sizes, sometimes when the soil is dry, and in other cases when it is wet, and then it is united with under-draining: it is practised when the object is to deepen the soil or to mix a portion of the subsoil along with it; when the subsoil is *tilly* or very tenacious, as well as when that next the surface is unproductive, mossy or exhausted by over-cropping; and lastly when the land is *foul*, when cleaner and stronger soil can be brought to the surface.

"The expense, it must be confessed, could not have been borne in many cases, if the *first crop*—for so it may be called, as it covered the *whole soil*—that was raised by the spade and mattock, had not produced from thirty to fifty pounds per acre: this was a crop of granite stones, which was sold for paving the streets of London! But, after all, the ground that was thus gained to the community would not have been able to recompense the cultivator, if a mixture of the spade and plough husbandry had not been introduced. The rent of the land in the vicinity of Aberdeen is extremely high, being now, on a lease for years, from five pounds to ten pounds sterling per acre, and, in a few cases, not less than eighteen pounds! Yet all this is necessary to remunerate the improver, who trenched, dunged, limed, and cultivated this thin soil, and which must still be frequently manured. It would have yielded too little produce if tilled only by the plough, and would have been cultivated at too great expense if the soil had been constantly dug with the spade; a medium between these two—either the alternate use of the plough and spade, or at least a mixture of plough and spade husbandry—was thus introduced by necessity, and has been attended with the happiest effects."

With little exception, the whole tract of country from Seville to Antequera, in Spain, although of the *richest possible description*, is in the most wretched state of cultivation; no enclosures, and such is the state of personal insecurity, that no farmer or proprietor ventures to reside on his own land!

THE NEW THEORY.*

From the Journal of the American Silk Society.

Cambridge, E. S. Md., Sept. 28, 1840.

Gideon B. Smith—Dear Sir—In your 'Silk Journal' of August last, you maintain that the silk-worm "requires exactly twelve months to pass through the various stages of its existence;" "that, if hatched on May 1, 1840, the eggs produced must be hatched on May 1, 1841, or nearly so;" and that otherwise, if hastened, or protracted, disease and death must be the consequence to the new progeny!—and you believe that analogy will sustain the opinion. (1)

This, indeed, is a grave and serious subject, out of which grows a question of deep concern to the country at large; and more especially to those whose sanguine and ardent spirits may have led them to embark heavily in the design of this new enterprise; buoyed as they were, by the new discovery of protraction, and multiplication of the crops, at pleasure; which would, if established, add seven-fold to the profits of their labor.

"Silk-culture," if nothing more than one crop can be produced in the season, will be a poor business; and nothing more than one crop will be attained, if the above sentiment be correct; the difficulty of procuring stocks of eggs, of the precise age for every respective crop—and the frequent impositions which will be practised by unprincipled vendors, will be quite insuperable; and one crop only, as in Europe and Asia, will be the whole practicable result.

The difference which this counter discovery, or new position will make, in our prospects of the silk culture, below that of the *many* crops, is incalculable, and unquestionably fatal—if true; the cost—labor—and leaves will be nearly seven to one greater, than if *seven*, the supposed practicable number of crops under the previous discovery could be accomplished—the same rooms—fixtures, and other accommodations must, in such case, be made for one million, as in the other for seven millions; the foliage to be supplied wholly in the space of a few weeks, will require uncountably more trees than were as many months allowed for them to *leaf* and *releaf* for each and every crop through the season; the labor being all re-

quired at *one time*, will be very troublesome, and costly to Maryland—and to all those spacious and very suitable regions, south of the Potomac and Ohio, where *annual*, and not *daily* labor is generally employed; an immense number of laborers must in this case, be reserved for about two months' services—before and afterwards, through the year, a cumbrous tax, not always to be disposed of, at seasons when every trustworthy farmer has his supply. (2)

Hence, an inquiry into the merits of the new theory, and the grounds on which it rests, becomes highly interesting.

I grant, it is strange the important discovery of Mr. Carson, "that the hatching of silk-worm eggs, may be a long time protracted without injury to the progeny, had never been made in Europe or Asia, where that culture had so long been a prominent occupation?"—yet, equally strange it is, that many all-important discoveries and improvements in the arts and sciences are daily developing, which had remained hidden to the eye and mind of man from times unknown; we must approach the subject, then, without the prejudice of interest or novelty.

You adduce a case in analogy of the "swallow martin" seeking a suitable climate, at a particular season, as an instance in point—this case is not, in my opinion, applicable; instinct prompts the bird, by the *instrumentality of its feelings*, to seek a new domicile, as a dog would remove from an overheated fireside, to a cooler part of the room; volition is here involved; the eggs of the worm do not come into action by instinct—by this motive the worm may *deposit them*—but they must await the essential and unerring power of heat, for their development; until this be applied, they are, (other injuries excepted)—*quasi new*; a fact well known in the New York establishments for the purpose, where all sorts of eggs, without regard to the dates of their deposit, are, if sound, hatched, and produce good progenies. (3)

The "American locust"—your other case of analogy, I consider equally remote; very truly, it may perform the septennial revolutions, from the date of its eggs, having received the influence of a sufficiency of heat to bring them into life; which, when the parent has made its deposit at the approach of the vernal sun, will occur in regular order—unless, by accident or design, this vivifying cause be intercepted; in which case the effect will, of necessity, be retarded, and possibly to another year, or more; and in proof of this occurrence, annually are seen many stragglers, not moving in the natural and septennial cycle; and it has not been shown in the case relied upon, that these, or the product of the eggs of *these stragglers*, would be diseased, or perish; which, as I understand, is the very gist of the question it is adduced to settle; and, therefore, it is not in point. (4)

In regard to the question at issue, entomology is so little studied, that more light is to be drawn from the vegetable, than the animal world; and it would seem superfluous, with the most of your readers, to premise the fact of the very great analogy, in a physiological view, which oviparous insects in general bear to plants, and particularly in the production of their progeny, from *seeds* and *eggs*; a subject clearly and scientifically treated in Darwin's *Phytologia*—and elsewhere.

* In a previous number of the 'Farmers' Register,' we presented the new theory of Dr. Gideon B. Smith in regard to the retarding of the hatching of silk-worms' eggs, as well as the remarks of one of our most experienced and intelligent silk-culturists approving thereof in advance. We now add some objections as well as answers thereto, so that our readers may have the best opportunity for hearing opinions, both *pro* and *con*, on this novel and interesting subject. For our own part, we can only say, as yet, that we heartily wish the new theory may be sound; as the knowledge of any certain and general causes of failure of eggs, and consequently of rearings of silk-worms, will bring culturists so much nearer to the certainty of success in rearing hereafter—a result which we do not appreciate the less, nor less anxiously desire to be produced, because the events of this year have served greatly to lower our previous confident hopes and expectations.—ED. F. R.

Instances of the dormant state, in which the seeds of the plants may remain for many years, and without injury to their final production, are numerous; and daily instances occur of the seeds of plants dug up from depths beyond the reach of atmospheric and other vegetative influences—dormant and unimpaired; the vital principle, though sleeping, had resisted their decomposition, and was ready to receive the impulse to a future and healthy life. Clover seed has been known to vegetate and flourish, after a sleep in the bowels of the earth, for twenty years or more. Grains of wheat, it is well authenticated, have been taken up with mummies, from the catacombs of Egypt, after a lapse, probably, of as many centuries, and have vegetated, and yielded a healthy product.

In truth no physiological fact is better established, than the indefinite dormancy of the seed of plants, while deprived of the influence of the agents of vegetation, and the revival upon their admission into a full and healthy action.

From the period of the elicited spark of actual life—and of the partial performance of physiological functions—the date of the term of its vital existence commences whether that term be one, or many years; or dependent on future physical agencies which may control it. (5)

In this class of animals—the oviparous—few observations have been made on this point. Yet the general analogy before alluded to, and the similarity of principles, under a similarity of circumstances, may justify similar conclusions.

The diverse terms of life, in animals and vegetables are dependent on their various and respective structures, adjusted for their growth and consumption; and the period necessarily commences from that of organic effort; before that time, none of its structure being called into action, no portion of its physical being can be impaired, or its duration shortened; and the entire term (if any) allotted by nature, will take date, not from the sleeping, but from the excited or actual life; from this term it had begun to grow, use its energies, and consume its term of vital existence. These remarks are necessarily not applicable to the viviparous animals, whose embryo is not dependent on casual, or extrinsic warmth, or other agencies;—its evolutions begin and progress with regularity, from its first inception, the embryo of the seed, and that of the egg, it is well known, sleep after impregnation, till excited; and as soon would I expect a lamp to burn out its contents without being lighted, as that a silk-worm egg should impair, or consume a part of its natural term, before its actual life had commenced;—when this has commenced, it cannot be repressed, or retarded, consistently with the health of the animal, and the attempt may, *a priori*—and no doubt will be attended with injury. (6)

Finally, the experiment, though accidental, of Mr. Carson, "of retarding the hatching of silk worm eggs, from 1837 to 1839," is conclusive; your suggestion of the possibility of a mistake, is nothing more than what the lawyers would call a "*potentia remotissima*."

Mr. McLean's experiment, which was highly flattering, made a protraction of about one month, and the progeny healthy.

My own experiment, reported by me for your Journal, made a protraction of little more than three months. In this case, the first hatching

was on April 28, 1840; the third, on August 1st ensuing, from eggs of the *same identical hatching*, to wit: on May 3d or 4th, 1839, as positively asserted by the gentleman of whom I purchased them, who had a memorandum of the fact. In my report I added the following, viz: "in this case, above stated, there can be no mistake in respect to the identical age of all the eggs—they were purchased by me of a gentleman in Cambridge, my neighbor, who reared, the last year (1839) for the first and only time, a solitary crop of cocoons, and he sold to me the whole of their product of eggs; I obtained none from any other person, either before or since, or at any other time whatever."

From the whole premises, I am irresistibly led to conclude—that the new position you have taken against retarding silk-worm eggs, is erroneous, that the eggs will continue unaffected and dormant without injury, almost indefinitely, until brought within a hatching temperature; and consequently, that retarding the process beyond the usual or natural period, is practicable without impairing the health of the progeny; and that the embryo having undergone excitation, cannot be repressed without injury to the product, in a greater or less degree.

And I confidently believe that subsequent experiments will confirm the accuracy of the few already made, and above quoted; and that the general and extensive failures of the present year, may be referred to the singularly unfavorable season, requiring singularly diligent management and attention. Respectfully yours, &c.

JOSEPH E. MUSE.

REMARKS BY THE EDITOR ON THE PRECEDING COMMUNICATION.

(1) The Doctor asserts that we maintain that "the silk-worm requires exactly twelve months to pass through the various stages of its existence." What we did say was, that "the silk-worm, when left to itself, exposed to the ordinary atmosphere, hatches in the spring of the year exactly at the time the mulberry leaves open. It is therefore an annual insect, and requires exactly twelve months to pass through the various stages of its existence. If, for example, a silk-worm was hatched on the first day of May 1840, the eggs that it would produce would *naturally* hatch on the 1st day of May 1841." The variations, and omissions in the Doctor's quotation, and what we actually said are marked by *italics*. We were speaking of the silk-worm in a state of nature and not of its domesticated condition, or of what it could be made to do by artificial means. We inferred, however, from the fact that it was an annual insect, and thus required a full year to complete its circle of existence in a state of nature, the existence of a law of nature which could not be violated to any considerable extent with impunity. We do not pretend to assume that nature's operations may not be greatly modified by art; and we distinctly stated that by artificial means, the eggs of silk-worms might be retarded or accelerated in hatching one month without material injury. The position assumed was and is, that the precise time silk-worm eggs will *naturally* hatch, is one year from the time their parents were hatched; and the longer they are retarded beyond that time

the greater will be the injury the progeny will sustain. We shall have occasion to recur to this subject in the course of this paper.

(2) This is entirely erroneous, we think. "This new position or counter discovery" is, in the humble opinion of the writer hereof, the only means that will or can insure us the advantages of several crops of worms,—five, or seven or seventy, as you may please,—during a season. In the words of a friend, (whose private letter we regret we have not the privilege of publishing,)—"if true, your new theory is the only means of rescuing it, [the silk culture] from total failure; if erroneous, it is impossible for it to operate injuriously. All the inconvenience it can produce is to put cultivators to the trouble of saving silk-worm eggs three or four times during the season, instead of once. If once will do, then of course there is no use in repeating the operation; but if you have to do it six times, what does the trouble amount to? and how is it to 'prostrate' the business?" The writer of this extract is not an observer of a day or a year; he has the advantage of five or six years' experience, upon an extensive scale, and with personal supervision. As to the frequent impositions that will be practised by unprincipled vendors of eggs, we have heretofore shown how these evils may be avoided—that is by every person producing his own eggs,—which, by the way, he ought to do under any system; for he will always, and under any circumstances, if he depends upon others for eggs, be subject to more or less of disappointment. We contend, however, that under our system there will be less opportunity for imposition of this kind than any other, for the obvious reason that the vender will be required to furnish evidence of the character of the eggs with much more particularity than he is at present. Now he is only required to say that the eggs are of a particular kind, of a healthy stock, and that they have been properly kept. Under our system he must furnish the precise date at which the worms were hatched that produced the eggs, in addition to all the above. Not only so, but he must furnish eggs of all the different dates required, and satisfy the purchaser of the correctness of those dates, and vouch for it with his own responsibility.

(3) The position here assumed is clearly untenable. If it were true that "all sorts of eggs, without regard to the date of their deposit, are, if sound, hatched, and produce good progenies," by the application of heat, then why are not silk-worm eggs hatched the same season they are produced? Doctor Muse must know full well, that silk-worm eggs will not hatch the same season they are produced by the worms, (except the two-crop kinds) and therefore that something besides "the essential and unerring power of heat," is necessary for the hatching of the eggs. It is well known that the common silk-worm eggs, though produced in June, will withstand all the heat of the succeeding July, August, and September, without hatching; and that in the ensuing spring they will hatch, though the temperature be many degrees lower than that they had passed through the season before. If nothing but heat were required, why did they not hatch when the mercury stood for weeks together at 80° and 90°, the season before? and if heat be the "essential power," why do they hatch in March and April, when the temperature is many degrees lower than

it was in the preceding July and August? But, if the "essential power of heat" were all that is necessary to hatch silk-worm eggs, the Doctor could easily accomplish his seven crops of worms, even under the new system; for, having perfect and unlimited control over "the essential and unerring power of heat," he could hatch the eggs in a day or two after they are laid, and thus avoid all risk of injury by retarding, all expense of ice-houses, and fill his cocoeneries and occupy his fixtures, seven times to his heart's content.

But heat is not the "essential power" engaged in the development of silk-worms, or any other insect or animal, *oviparous* or *viviparous*. Heat is not life, though the latter is partly cherished and supported by the former. We believe that time is an essential power in the generation of all animals, *oviparous* and *viviparous*. The period of gestation required by *viviparous* animals in the uterus, is required also in *oviparous* animals in the egg. For example, with *viviparous* animals a certain time is required after the germ is impregnated for the embryo to mature. In the case most familiar to us all, this time or period is *nine months*; and in all animals it is fixed by the laws of nature; in some cases eleven months, and in some others five months; each genus of animals having a period of gestation of its own, and very few genera the same. But in the case of *oviparous* animals, this period of uterine gestation is substituted by gestation in the egg. Immediately after the germ is impregnated it is detached from the ovarium, and the gestation of the new animal commences in the egg. Now the question in dispute is, is there any *precise period* of gestation required; that is, is there any particular time after the egg is laid before it will hatch? We know there is; and we know that all the power of heat and all other powers combined cannot abbreviate that period. However diligently the hen may sit upon her eggs, she cannot hatch them before the precise time appointed by nature for their hatching—twenty-one days. We know that in the case of eggs, the period of gestation—we mean the time from the detachment of the germ to the hatching of the egg—may be prolonged by artificial means to a longer period than uterine gestation can; but we do not believe that the precise period has been fixed by nature for every species of egg to hatch, as certainly as has been the period of uterine gestation; and that if, by the withholding the necessary heat or air or any other essential power, the egg is prevented hatching at that period, its product will suffer more and more according to the length of time the hatching shall be retarded. If eggs of any kind can be kept from hatching any length of time desired, why can we not keep hens' eggs to any length of time we please by keeping them cold? If then a period of gestation be requisite in *oviparous* as well as in *viviparous* animals, as we contend is the case, then the eggs of all animals have a time certain fixed for their hatching; and if so, this period can neither be abbreviated nor prolonged with impunity. We do not stop to notice exceptions to the rule; with reasonable men this is not necessary in arguments of this kind. For instance, many animals whose period of gestation is nine months, occasionally terminate that process in seven, or eight months, and sometimes prolong it to ten months, and both without material injury to the offspring; but these are only

exceptions to the rule, and do not impair the validity of the law. Now if our argument be correct, silk-worm eggs have a period which they require for their maturity, equivalent to that of uterine gestation. We have already shown that they will not hatch the same season they are produced, however early they may have been laid in the season. If they do not require this period of gestation, why do they not hatch during the extremely hot weather of July and August? It is clear to our minds that they do require a certain time; but what that time is remains to be discovered. We never knew any eggs hatched in January, even in the far south, and we believe that among all the losses of eggs by premature hatching, very few ever occurred in New Orleans before the latter end of February. This would show the shortest period at which they are capable of hatching to be six or seven months from the time they are laid, or eight to nine months from the time their parents were hatched. But though, by a change of climate, their time of hatching may be thus accelerated two or three months, the same circumstance will prevent its being prolonged at all; for all the time that is gained on the one side is most surely taken from the other. We anticipate being laughed at by the Doctor for our *utopian idea* of what he will probably call ovogestation: but we can bear it.

(4) We alluded to the martin and American locust merely as illustrative of the fact of the precision of periodical developments and habits, in insects and animals. We did not rely upon them as any thing but *illustrations*; nor did we adduce them to "settle" the question. There is no proof whatever, however, that the few stragglers of the American locust, that appear occasionally, are the result of this vivifying cause, (heat,) being intercepted. In other words that they are the result of eggs retarded in their hatching. They are much more plausibly supposed to be individuals from other districts or families, that have strayed from home or been carried to their present location by high wind or some other agent. In Loudoun county, Virginia, the American locust appears at alternate intervals of eight and nine years. The Doctor would not thence infer, we presume, that one or the other of the families had been, by the interception of heat, *retarded in hatching eight or nine years?*

(5) The least tenable of all his arguments against our system is his reliance upon the analogy supposed to exist between vegetable seeds and eggs. If we admit the occurrence of "instances of the dormant state in which the seeds of the plants may remain for many years, and without injury to their final production," we cannot shut our eyes to the daily occurrence of facts of an opposite character. Indeed this opposite character is so frequently presented to our notice, that the few instances referred to by the Doctor, of an indefinite dormant state, that these latter may fairly be considered as mere "exceptions to the rule." How many instances can we not adduce of seeds that will not *bear retarding in hatching*, as well as silk-worm eggs? The white mulberry seed, for instance, every body knows, will not vegetate, if more than one year old; and coffee seeds will not vegetate if more than three months old, nor even then unless it shall have been preserved in a peculiar way. If the Doctor's pocket and

patience have not suffered from the failure of *old seeds* to vegetate, he is the luckiest of the tribe of Agricola; and in that case we must beg leave to refer him to the seedsmen, who will inform him that very few of their seeds will vegetate after they are twelve months old—many indeed will not after they are six or eight months old, and in this respect imitating the habit of silk-worm eggs, by vegetating not much later than the plants that produced them the year before vegetated. So well is this fact known, that honest and careful seedsmen clear out all their old stock of seeds they know to be of this character, at the close of every season, to make room for fresh ones. Therefore, vegetable seeds, however analogous they may be to silk-worm eggs, do not prove that silk-worm eggs can be retarded in hatching much beyond the period nature has assigned for the purpose.

(6) We differ with the Doctor entirely on this point. We believe that the lamp of life is lighted at the moment of impregnation—that the vivific influence is then communicated from the parent to the offspring, in both viviparous and oviparous animals. If this were not so each individual would be an independent creation—the stream of vitality would be interrupted at each generation. This however cannot be. The vital current passes from parent to progeny, and is only dependent on heat and other external agencies, in the egg, or in the uterus, precisely as it is in the perfect animal. At no time of life can animals exist without the aid of the proper degree of heat; and they are no more dependent upon heat for existence at one time than another; nor more so than they are upon other agencies, *nutrition*, for example. But heat never imparts to inert matter the *principle of life*. The vital principle has been derived from the parent, and may be warmed into activity by heat, if before dormant, in certain cases; or this vital principle may be extinguished by a withdrawal of the heat necessary to its existence,—and it may also be extinguished by confining the egg in a temperature too low for active life, but high enough merely to permit life to exist during and beyond the period of *gestation*, when it must expire,—precisely in the manner so many millions of silk-worm eggs were destroyed during the past season by attempts to retard their hatching to a time beyond their period of gestation. From what has been said it would appear that the embryo in the egg requires nutrition from the moment of its becoming an embryo, that it becomes an embryo at the moment of impregnation; and it is no more than reasonable that it should be so. This nutrition is furnished by the albumen of the egg. It also requires oxygen, and receives it from the air—perfect exclusion from air, or the formation of carbonic acid gas, and thus destroying the oxygen of the air in the vessel containing the eggs, is certain death to them. That the embryo from its inception requires nutrition, we suppose will be disputed; for, if it does, then there can be no further question as to a limit being assigned to the term or time of its remaining in the egg, for that limit will be regulated by the supply of nutriment. To us, however, the question is clear of all doubt. All organized beings, animals or vegetables, require nutrition;—in some stages of existence more, and in some less, it is true; but in all some portion. Then may not the length of time silk-worm eggs can be kept without hatch-

ing, be regulated by this principle alone? May they not exhaust their supply of nourishment, and thus cease to live? G. B. S.

DOCTOR MUSE'S REJOINDER TO THE EDITOR.

Cambridge, E. S. Md. Oct. 7, 1840.

Gideon B. Smith, Esq.—The critical remarks with which you have done me the honour to accompany the report of my experiment on the culture of silk, require at least a short reply, which I hope you will find room for in your next Journal.

In page 269 of your September number, you have appended to my report the following notice: "if the cocoons weigh 176 to the pound, as the writer states, then the bushel of cocoons would weigh 19 lbs. to make 30 bushels contain 100,000." By referring to that, and a part of the previous page, you will readily perceive, that the quantities, which you have assumed for your *proportionals*, to arrive at the 19 lbs. per bushel, are not only not warranted in the text, by the remotest possibility of construction, but are actually guarded against, by explicit language: you will find it there stated, that the 'dark drab' portion of them were of the size named; but, that "the 'white mammoth' portion (so called) were *small, both worms and cocoons*;" then, it is wholly unjustifiable to assume in your estimate, that the entire crop were of the same large and equal size—when a *portion* of them was *contradistinguished*, from another *portion*, as *small*: indeed it required about 4,000 of the "white" to fill a bushel; and a half or more were of the "white" sort: I used this large number of the "white"—all that I had of them in the first crop—believing it to be an inferior variety; because, its being the first parcel I had ever undertaken, I preferred to hazard them chiefly, rather than the best, to the errors of inexperience. Both varieties I had bought of the same gentleman; and his register states, that they were hatched at the same time, and under his charge, on May 3d and 4th, 1839. The respective numbers of each portion, I considered unessential in my report; and I did not name them—equally so was the whole number of the crop, whether 65,000 as you make it, or 100,000; yet, I believe the rough estimate I made of 100,000, nearly correct.

In page 270 you quote from my report, "the doors were seldom closed—and never more than ten or fifteen minutes,"—and you ask, "is there not some mistake here, in transcribing the article?" and you continue—"you do not see how the temperature could be kept so *equable*, as is represented in the text: or how the damp air could be excluded." I aver that the text conveys no idea of a remarkable *equability* of temperature; but simply, that it was not allowed to descend below 65°: such was my order; possibly it might have been occasionally violated; yet, to my knowledge it was not; it surely was a very easy task for the manager, who was exclusively engaged in the laboratory. The rooms being plastered and close; the door in each opening into an inner passage—the temperature in the month of May, though colder than usual for the season, could be readily raised by a fire—the doors and windows closed, to much more than 65°: and thus raised the door may be opened—the windows kept closed as was in my case, and the fire continued; and as

much as 65° could easily be preserved for a considerable time; the text further states, that the fire, and other parts of the process, were more frequent and longer continued, as the "damp" and "cold" seemed to indicate the necessity.

The danger of a confined atmosphere, to animal health, and life, is notorious; it is said a single candle flame will consume a bushel of atmosphere in a minute; then, it may well be inferred, that the multiplied flames of a common fire, in a closed room, of ordinary size, would accomplish the exhaustion of the oxygen, or pure principle of the atmosphere of the room, in a very short time, and render it unfit for respiration; and more especially in the case of the silk worm, whose mephitic offensive transpiration, if confined, would considerably hasten the impurity; and I owe it very much to my caution on this point, that the rooms of my laboratory were not offensive; and required neither the chloride of lime, nor any other chemical re-agent whatever.

In another note, page 271, you say, "justice to 'P.' requires that we relieve him from censure—and that you alone are responsible for the hypothesis." I intended no censure for 'P.' or yourself, but simply to offer my testimony against it, which I did not consider as censure or offence.

'P' asked the question, page 239, August number, whether *retarding* is injurious, &c. &c. and you answered it.

In your last note upon my report, page 272, you say "instead of a refutation of the hypothesis, you view it (my experiment) as going to establish your theory against retarding the hatching, as far as a single case can be expected to go."

This sentiment, I confess, surprises me; your theory maintains in your August number, page 226, that the silk worm exposed to the ordinary natural temperature, requires exactly twelve months to pass through the various stages of its existence; you admit subsequently, the hatching may be protracted one month; but you say "eggs that would have hatched naturally the 1st of May will, if protracted to 1st of July, (that is two months,) become in their progeny diseased and perish sooner or later after being hatched."

Under my experiment, which you think goes to establish this position, eggs were hatched 28th April, and the worms did not become diseased; and another part of the eggs of the same identical stock and date, were hatched the 1st of August—that is, three months after; and yet the worms did not become diseased, and perish, but were equally free from disease, with the exception of about two dozen, from an accident—and they made good cocoons; how this can go to establish your doctrine—"that protraction beyond one month, will occasion disease and death," I cannot comprehend; you say, because the greater part of my papers of eggs in August did not hatch; but you will hold in mind that several thousands did hatch and prosper, were free from disease, and did *finish* their work; which fact is surely adverse to your doctrine, as much so, as if all had hatched; the cause of the *many* not hatching, may be fairly referred to their bad condition, when purchased; at that early date a few on some of the papers had already hatched—many had the different tints of color, indicative of advancement in different grades; and others retained their primitive gray, indicative of no advancement; this latter class, I

presume, were those which passed successfully through the ordeal of ice, and time, to August; the others having been previously advanced from the embryo, by causes unknown all perished. I have since understood, that it is not unusual, that a simultaneous deposit of eggs, on the same paper, and apparently under similar exposure, may exhibit the various grades of advancement; however mysterious and unintelligible, yet I believe the fact is unquestionable.

If my language has been obscure in the drafting of my report, as, from some of your notes, it seems to have been, I can only say, I much regret it.

I am, very respectfully, yours, &c.

JOSEPH E. MUSE.

POITOU ASSES.

From the Kentucky Farmer.

Maplewood, Oct. 30, 1840.

Dear Sir,—In the fall of 1835, I travelled in France from Paris to Bordeaux, and was much struck by the teams of large and heavy mules, which I saw as I advanced towards the latter place, drawing road wagons, laden with the wines and fruits of the south. Upon making some inquiry, I ascertained that they were begotten upon large Normandy or Brittany mares by a distinct race of asses peculiar to the old Province of Poitou, and not to be found any where else. The mules appeared to me of a description peculiarly suited for draught. Unlike those descended from Maltese asses, with which I was acquainted in Kentucky, they had large bones, heavy bodies and thick tails like horses. If the Maltese mules have more action and beauty, and are better calculated for the saddle and harness, these, it seemed to me, had more strength and constitution, and would probably suit better the plough and the dray. If the first would suit mountainous countries better, the latter might perhaps answer best in wet and low lands. At all events, I thought it worthy of an experiment to ascertain if Kentucky might not be benefited by the introduction of this new race. I was of opinion that possibly the cross with our part blooded mares would produce an animal well fitted for the work of drays and plantations, and that even our old breeds of asses might be benefited by an infusion of blood from this sturdy stock of France.

Acting upon these views, I selected a male and two females of the best that could be had, and had them shipped to New York. The male—a noble animal of the kind—and the lesser of the females died at sea, in a storm. The remaining jennet I have now in my possession. Not discouraged by this accident, my father (H. Clay) and myself sent an order to France for more, and received through the American consul at Havre, six animals of this stock—two males and four females.

We have had them now for several years, and though the experiment with them is not complete, it wears a promising aspect. Certain it is, that the French mule, bred as before stated, is larger than the mule of America, and to judge by appearance, much stronger and more capable of work. But it may be that its superiority in these respects is due in part to the dam. This will be

tested in a short time, and if it turns out to be the case, it indicates the necessity of a double improvement, in the ass and in the farm mare.

It may interest some of your readers to know that the Normandy horse is somewhat above the medium size, generally of dull colors—frequently roan, heavy in the neck and crest, with a straight shoulder, good back, heavy quarters and wide across the hips. They are fine but not handsome horses, capable of much work, docile and not dainty in their habits, of sufficient courage and iron constitutions. They are fit for almost any work. They pull the French diligences at the rate of six or seven miles an hour, or a post-chaise much faster—frequently travelling in a short gallop. By officers who served in the Peninsular war, I was informed that they excelled for cavalry and artillery purposes—especially towards the winding up of a campaign—the sleek and beautiful horses which were sent from England.

My object in writing this note is to preserve in your valuable paper the memory of the importation mentioned above, as it may hereafter be interesting to the breeders of Kentucky.

With the best wishes for your success in the noble cause to which you have devoted your energies, I remain faithfully your friend,

HENRY CLAY, JR.

THE BENEFIT OF THE TREADING OF ANIMALS ON NEWLY SOWN WHEAT. THE "TRAMPLING ROLLER."

Many farms in lower Virginia have been greatly improved in fertility by the "inclosing system," that is, the prohibition of grazing, and giving the grass and weeds as manure to the land. But, on light soils especially, the crops of wheat have been thereby rendered very precarious, owing to the texture of the soil becoming too open and loose. Both wheat and clover thrive much better on soils of moderately compact and close texture, under equal circumstances of constitution, and of chemical combination of the ingredients of soils. By the total cessation of grazing, and relief from the treading of cattle, the ill effects to these two crops, and especially to wheat, will be experienced to a very injurious extent, on the best constituted soils. The remedy may appear obvious, and easy; and perhaps in many cases it is too easy to be applied; for by returning to grazing, though the faulty texture of the soil may be altered, the benefit is dearly paid for in renewing the old course of impoverishing the land. But in other cases, it is difficult to return to regular grazing, owing to the removal of the fences which before separated the different fields, and sometimes even the different farms.

As a substitute more or less effective, for the treading of wheat land previous to its being ploughed up for sowing, or for the preparatory crop, an excellent practice would be to have the

field well trampled after sowing, and before the coming up of the plants. The benefits of this practice have been highly appreciated by some of the best farmers in Scotland; and, if beneficial on their previously grazed and stiff lands, and under their dripping climate, the practice would be far more so on our lands, of opposite condition in all these three respects. One among the great wheat farmers from whose answers to queries Sir John Sinclair digested his 'Husbandry of Scotland,' when speaking on this question, said that the freshly sown wheat land could not be too much trodden—and that he would be glad if a regiment of cavalry were to exercise their manœuvres on every acre of his field after its being sown. There is also stated in Rozier's '*Cours Complet d'Agriculture Française*,' a case of a newly sown wheat field being used to confine a flock of sheep, and which, by neglect, and by the sheep generally crowding at night towards the entrance, was trampled so much, that it was supposed that a part of the crop would be entirely lost. But, contrary to expectation, none of it suffered, and the part most trampled was the best. We quote from memory, not having read either of the passages referred to for many years, but believe that the main facts are correctly stated.

On a farm where the evil of a puffy soil, owing to the cessation of grazing, had been very sensibly felt, we advised the construction and use of a *trampling roller*, which, so far as we know, is entirely new. A round log of 5 feet length and 18 inches in diameter was bored full of holes, and large pins driven in, of 9 inches length clear of the log. These pins were two inches, or more, across their outer ends, or "tread," and these ends not more than 2 to 3 inches apart from each other in any direction. The outer ends of the pins were sawed off (where required) so as for their extremities to give a cylindrical surface, of 3 feet in diameter. The roller was set in a square frame to be drawn by; and when finished, seemed so heavy and unwieldy, that the negro driver (before hitching to) was sure that his team of four ordinary oxen could not draw it throughout the day. However, on trial, it proved to be a light draught, and much more so than the large square harrow used to cover the seed, and which sweeps about the same width.

The operation of this roller was altogether satisfactory, so far as can be judged in advance of results. Unluckily no strip of the piece of land so treated was left without the operation, for comparison of effects. Besides the trampling and consolidating the mould, generally, as was desired, the pins mashed every clod of any size, and much more effectually than is done by the usual mode

of breaking clods by hand labor with the eyes of hoes. In the latter case, the large clods are merely broken into small ones; in the other, the more gradual but very heavy pressure of the roller not only breaks, but pulverizes the clods. And where much of this operation is needed, as on rough fallows, it may be well questioned whether the mere expense of breaking clods by hand labor, is not more costly than running a trampling roller.

The idea of this implement was furnished by that of the iron-spike roller, which is thinly set with sharp iron spikes, as this is, thickly, with blunt wooden pins. But the objects and operations of the two are very different. The spike roller is designed to reduce and make fine and loose the soil of very rough, cloddy, and soddy fallows, to prepare the land for tillage or for seed—whereas, the main design of the other is to consolidate the already too loose and open mould. The operation of the common roller is also very different, as that does not press sufficiently heavy on any places to serve much to consolidate, except merely at the surface; and by making the surface smooth and even, exposes the crops injuriously to the cold of winter. Smooth rolling hardens the surface, and thereby closes it against the influence of the air, and yet does not materially compact the soil below. The operation of the trampling roller is the reverse in both these respects.—ED. F. R.

HARVESTING CARROTS.

From the Southern Cultivator.

Mr. Editor—If not too late, I will furnish you a few hints in regard to gathering and preserving this valuable crop through the winter. There are not many carrots grown in this state, and hence possibly the propriety of giving a few plain rules for taking care of them at this season.

It is an old opinion that carrots grow more in October than in any previous month. However that is, October is now gone, and carrots should be gathered. The first of November is a very good time for this operation. Before gathering, cut the tops about an inch above the crown with a sharp hoe. They are good food for cattle, and cows are fond of them. Then run a plough deep, drawn by a couple of horses, as close to the row as possible, when the carrots may be easily pulled and thrown into heaps or a cart. They will not stand as much cold as parsnips, but will keep very well in common dry cellars, covered over with a little straw or dry sand thrown freely among them. They may be kept perfectly well in open ground by selecting a high, dry spot, and digging a hole about one foot deep, four feet wide, and of any length you may wish, and laying the roots in, and piling them up three or four feet high, and covering them over six to twelve inches with straw. The advantage of raising the pile above the ground is to permit a slight circulation of air and

escape of heat which is apt to generate especially when the hill is first made. The covering of straw should first be made light, and then increased as the weather grows colder. The hole should be so made that water will not remain and settle on the bottom.

B. S.

REMARKS ON THE SOILS AND MARLING OF
THE PAMUNKEY LANDS. INTRODUCTORY
TO THE QUERIES AND ANSWERS THEREON.

By the Editor.

The borders of the Pamunkey river are of peculiar and singular character. The flats extend generally from a mile to two, and sometimes even three miles in width, from the river, the high-land or bluffs rarely, though sometimes, approaching on either side near to the water. The flats are divided, in common parlance, into the *low-grounds* proper, and the *second low-grounds*, which rise to a much greater elevation than the former, and generally by an abrupt and marked transition. Though the low-grounds next the river are generally from 3 to 10 feet above high tide, a large portion is subject to be inundated by freshes, which sometimes, though rarely, rise many feet above the highest tide. This subjection to freshes, so uncommon on any of our tide-water rivers, is caused by the peculiar and remarkable narrowness of the Pamunkey, and its very crooked and meandering course. These natural causes, which cannot be avoided, are much increased by the artificial obstructions to the course of the water, formed by fish-weirs and traps, and fallen trees. If these were cleared away, and the trees on the margin removed, it is probable that the highest freshes would be reduced to several feet at least below the heights known and expected.

Though the greater part of the low-grounds and all of the second low-grounds are elevated far above any possible height of the water, in the present age, it is not the less manifest that the soil was originally deposited by alluvion. This great operation of nature, like similar effects on the lower James river, could only have been produced when both the height and volume of the water very far surpassed the present state of things. But it is proper to bear in mind this ancient formation by alluvion, as it serves to account for the peculiar characters of the soil, in respect to its uniform features and original fertility.

The soil of the Pamunkey low-grounds, both first and second, though formerly reduced almost every where to a low rate of product, was undoubtedly rich in its virgin state, but in a much less degree than the James river low-grounds, and others of the highest grade of original value. All verbal testimony is in support of this position. But still stronger evidence than such traditional accounts is presented, to my understanding, by the characteristics of the land, whether still continuing exhausted, or where recently again fertilized. All these lands are very light, from excess of sand; but all, so far as I was informed by report, were enough kind to clover, even before being marled, to justify the culture of that grass, where enough putrescent manures were applied; and gypsum, where tried, (on Chericoke,) was found to be

beneficial to and profitable on clover. These two characteristics would be enough for me, any where in the tide-water region, to prove that such soil was *neutral*, and had been originally rich.

But though there is much uniformity in the general character of the Pamunkey low-lands, there is also much difference of quality and of value in minor points. Some of the land, as at Chericoke, was of chocolate-colored or mulatto soil; on other parts, and especially higher up the river, that peculiar mark of value was wanting, and the soil was inferior, though still of good original quality. In addition to the happy natural constitution of the Pamunkey soils in regard to fertility, and improvement by gypsum, and still more by putrescent manures, their lightness makes them easy to till, and easy to be relieved of superabundant moisture. The latter effect is also aided by the form of the surface, which is generally very slightly undulating, instead of being as level as its original formation might indicate.

But with all these advantages, there is one other which I would have supposed these soils (in common with other good neutral soils) would have wanted; that is, a capacity, such as the baser acid soils have, for being improved speedily, and in a high degree, by the application of marl. Such would have been my deduction, founded on experience of the operation of manures merely calcareous. But the marls which underlie these Pamunkey low-lands are universally mixed with green-sand; and from that compound a degree of effect and of profitable improvement has been derived, equal to that from pure calcareous marl on acid soils elsewhere.

I shall not here repeat the opinions and inferences in regard to green-sand which I have presented at several places in past volumes of the 'Farmers' Register;' nor will I, at this time, speculate, without light, on the hidden cause of the mysterious manuring operation of this earth; though my former views would be still more sustained by the facts which are elicited by the most recent observations. To this interesting and important subject I will hereafter recur, after having presented all the facts which will go either to confirm or overthrow theoretical views, and the fancies and vagaries of what are dignified by the name of scientific investigations of this subject. It will be merely necessary now to advert concisely to some of the general facts before observed, and also some of the grounds which I have heretofore maintained, and which even those of my readers who saw them when first presented could not be expected to remember now.

I do not pretend to know the cause, or how to explain the remarkable and mysterious operation, of green-sand as manure. In this respect, I readily confess my entire ignorance. Yet, my admitted ignorance is not greater than that of the geologists who have flourished so much on this subject, and have commanded respect for their crude opinions, by presuming on the greater ignorance, and greater modesty and deference to learned authority, of the agricultural community. The attributing the particular fertilizing effects of green-sand to the small contents of potash is as little supported by *reason*, as the assertion of the general operation of green-sand on all soils and all crops is by *facts*. Up to this time, and with the exception of the experience of Mr. Williams

Carter, heard of first only a few days ago, I have known of but a single fact in regard to the effects of green-sand *alone*, in Virginia, except in my own experiments. And on these three experimenters only will I still have to rely. Notwithstanding all the excitement produced in regard to green-sand, by the opinions expressed in the state geological reports of its great and general efficacy, and although these opinions have generally received much respect and credence, which they owed entirely to their *authority*, still, so far as I have been informed, there have yet been no other experiments made with green-sand *simply*, in Virginia, on soil not calcareous, except in the cases just referred to. It is probable that many other experiments may have been made; but, if so, I have heard nothing of the results or the trials.

But while confessing ignorance on this subject, it is neither my wish nor my habit to wrap myself up in prejudice, and repel light and instruction from any quarter, even though it may serve to show that my opinions are erroneous. Besides other less direct demands for the practical information which I was so anxious to obtain on this subject, more than three years ago, (at page 511 of Vol. V.,) I submitted particular queries in regard to the effects of green-sand, addressed to all who had used it. These produced not a single answer, and probably induced not one experiment. I still as earnestly desire information; and will be as ready to submit to such as will contradict my views, as to welcome any in confirmation. But until such disproof is furnished, I may be excused for trusting to my own practical experience, however contradictory it may be to closest speculations, and the one-sided facts of geological reports.

Therefore, until corrected by the more accurate and full observations and experience of others, I shall continue to hold these opinions in regard to green-sand as manure in lower Virginia:

That, whatever may be the source of power of this earth, (which I deem as yet altogether unexplained,) it is similar in action and effects to the equally mysterious manure, gypsum, or plaster of Paris.

That, like gypsum, if used in small or moderate quantities, green-sand is only operative (or at least profitable) on neutral and calcareous soils, and rarely even on these soils on any crop except clover, and other plants of that family.

That green-sand is *not* operative at all on acid or naturally poor soils, unless in unusual and excessive quantities; and then, or in any mode of application, that the manure is, like gypsum, but of temporary effect.

And that, on acid soils, where it is least operative, after the land being marled (or otherwise made calcareous) the green-sand, like gypsum, generally becomes operative on clover.

Although the facts are as yet much too few to establish all these positions, I will venture to predict that accurate experimenters and observers will, if trying proper experiments, find results in accordance with my views. Thus I infer that the pure green-sand earth (that is, containing no shells or calcareous matter) will have no profitable if indeed any effect, unless in enormous quantity, on any crop on acid soils; that it *will* generally have good effect on clover on the same soils after marling, or when constituting part of the marl applied, or on soils naturally calcareous or neutral; and

that, even when most efficacious, if applied alone, or in such manner that its single operation can be estimated, the effect of green-sand will not be permanent, like calcareous manure, but temporary, like gypsum.

Now though I dissent altogether from the opinion that green-sand is, like a quack nostrum, a universal remedy for all diseases of land, and an improver of all soils and all crops, I value it more highly than some who have most profited by its use in conjunction with marl. Neither can it be alleged upon any plausible ground that I seek to disparage this manure, from prejudice or envy. Every prompting of vanity, as well as of self-interest, would induce precisely the contrary course; for I own extensive and rich beds of this earth, on the banks of James river; and, whatever may be the measure of the value of this earth, the discovery of its existence in Virginia, the earliest and most extensive trials of its effects, and the first idea and assertion of its identity with the famous green marl of New Jersey, all those merits, if they be such, were *mine*—as will be sufficiently evident to any inquirer who may refer to sundry pieces in the early volumes of the 'Farmers' Register,' on the New Jersey marl, and particularly to the earliest piece referring to it, my article "On the gypseous earth of James river," published in the first volume of the 'Farmers Register,' (p. 207,) which was extended from a shorter and much earlier communication to the old 'American Farmer,' and both of them referring to the discovery of the bed of earth made as early as 1817. It is very true, that being then, as now, ignorant of geological science and systems, I had never even heard of the term "green-sand," and of course did not use it; and moreover the action of the earth as manure was erroneously ascribed by me entirely to the gypsum which it sometimes contains, and not to the green-sand, of which I knew nothing. But the appearance and visible marks of the earth were so minutely and fully described, that it was impossible for any reader of the account, acquainted with green-sand elsewhere, to have mistaken the thing described, or to be doubtful of the similarity, if not identity, of the deposits.

This earth is found in great abundance along the banks of the Pamunkey, and, fortunately, is generally mixed with calcareous marl, to which intermixture the undoubtedly valuable effect of green-sand here is (as I infer) almost entirely owing. The beds of marl here are of the most ancient class of the tertiary marl (*eocone*) and in them the calcareous ingredient has, to greater or less extent, been removed, and substituted by green-sand. Over these beds of marl, as on James river, waters containing copperas (sulphate of iron) and alum (sulphate of alumine) are still oozing, and these salts are often perceptible both to the sight and taste. When meeting with shells or calcareous matter, both the former salts serve to decompose the carbonate of lime, and form, by new combination, sulphate of lime, or gypsum. Hence the removal of the shells, while their hollow forms yet remain perfect in the earth, and the total disappearance in many cases, (and this is generally so in the beds on James river,) of every trace of calcareous matter. And hence the appearance instead, of the more newly formed gypsum, in crystals, or in powder, as described in the article above referred to. But the gypsum has, in

the lapse of ages, been dissolved, and washed away either principally or entirely, and is only to be found in a few places, and in small proportion. The green-sand, in greater or smaller proportions, is found instead. Whence its origin, what was its formation, and even what its chemical constitution, I pretend not to understand. But even in the absence of all light on these points, the unlearned farmer may yet properly use, and profit by, this manure, and avoid falling into the gross and almost unmixed errors to which he would be led, if following merely the speculations and assertions thereon of geological reports, which speak of the manure in the most exalted terms, and offer none of the numerous and entire exceptions which oppose the opinion of its universal or even general efficacy.

The green-sand marl (that is, marl containing calcareous matter in large or considerable proportion, as well as green-sand,) is the only kind found under the Pamunkey low-grounds, and which has been thereon applied, for the 20 miles from Mr. Conrade Webb's farm in New Kent, to Edmund F. Wickham's in Hanover. The fertilizing effects have been very great—much more so, as they appeared to me, than *merely calcareous* marl could have produced so early on neutral soil—and I freely admit that a large share of the general benefit derived, must be due to the green-sand ingredient of the compound manure. Still, this opinion is held in subservience to the general propositions above stated as to its action; and therefore, I cannot but believe that the effect of the green-sand has lessened with time, or, in the oldest experiments, has even ceased, though no such effect has been observed or suspected, owing to the still *increasing* effect of the calcareous ingredient. However, as to this, let the reader judge for himself, from the answers which will be presented. These circumstances and effects are so peculiar, and so different in many respects from the action of merely calcareous marl, that I found myself on a new scene, in this green-sand marl region. The circumstances both of the Pamunkey soil and the marls are so different from those of the high and originally poor lands adjacent, that it will be proper to present the two classes under separate heads, instead of regarding either county or other artificial lines of division. The subject of the following answers will then be exclusively the Pamunkey low-grounds, and green-sand and calcareous marl, unless any partial exceptions to either should be particularly named.

Within a few days after returning from this interesting agricultural region, I visited Coggins farm, the scene of my own old marling labors, and was struck with the manifest inferiority of the growth of the young red clover which covers all the land from which wheat was reaped this year, to the clover of the same age on the green-sand marlings on the Pamunkey lands; and the comparison was made with parts of the land of Coggins farm where the greatest improvement had been made by marl, and where the last crop of corn was certainly equal in product to those lately on the highly improved Pamunkey lands, and, as I infer, to the last corn crops of the lands now bearing clover so much superior. This difference I cannot but ascribe to the action of the green-sand of the Pamunkey marl (not acting *alone*, but combined with and) superadded to the calca-

reous matter, which was exclusively (or *nearly so*) the active ingredient of the marl used in the cases referred to on Coggins farm. Although there are inexhaustible beds containing full 50 per cent. of green-sand, I had discontinued using that earth as manure, several years before having ceased to direct any farming operations; yet, under the impressions recently received, I would now advise the renewal of experiments, if not of general practice forthwith, and the commencement of trials wherever this earth can be used on clover, and on neutral or calcareous soils, or intermixed with, or after the application of calcareous marl. I would also advise smaller but sufficient experiments on other crops and other kinds of soils, to test the value of the opinions advanced above, as to the general inefficacy of this manure under such circumstances.

The ready answer to my denial of the *general efficacy* of green-sand as manure in lower Virginia, will be a reference to the extensive use and great benefits of this manure in New Jersey. As I know nothing *certain* of the particulars of these practices, either as to the precise nature of the manures, of the soils, the degree and permanency of effects, and especially of the *failures* (which are seldom if ever mentioned in published reports—) I will neither deny, nor receive as evidence, any thing that I have yet seen in regard to New Jersey marl and green-sand. I doubt not that great benefits have been there produced. But in the general ignorance of the cultivators, and the still more general confusion of terms as to the ingredients of the manures used, and the ignorance of geologists of agricultural science and truths, I suspend all expression of opinion, or particular inferences from the statements of New Jersey marling, until better informed as to the facts. My opinions of the effects of green-sand, as above and elsewhere expressed, are deduced from, and limited to, the operation as known by experiment in lower Virginia.

The agricultural community have been indebted to the writings (not of farmers, but) of geologists and scientific men, for the little truth and value, and the abundance of mystification, error, and false deductions, in regard to the action and effects to be expected of green-sand. The gain derived from these learned investigators would have been very far greater, and the errors much less, if they could have been content *not to know every thing* at the first glance; but, on the contrary, had submitted to confess their actual ignorance in many respects, and instead of deluding their confessedly unlearned disciples, the agriculturists, had asked the aid of their observations and experiments to dispel the great existing obscurity and difficulty of the subject. If geological surveyors were as much distinguished for the modesty and self-distrust which should belong to seekers of knowledge in a new field, and for patient labor of investigation in the pursuit, as they are for presumption, for the jumping to conclusions, and for scientific quackery, then their reports would have been a hundred-fold more profitable to the public—though possibly much less so to their individual interest and early reputation.

The operation of green-sand proper (or alone) is altogether a different matter from that of marl, and would not come under the queries designed to elicit statements of the effects of marl. But as these two manures, even when separate, are so

often confounded in common parlance and understanding, and as the substances also are intermixed in all the calcareous marls of the upper tide-waters of the Pamunkey, I shall add to the answers obtained on marling such accurate reports on the effects of green-sand alone as I may be able to obtain. Mr. Williams Carter's, at Broad Neck, in Hanover, is the only very considerable and continued practice known—and which is continued, as I fear, on the mistaken grounds of the supposed permanency of the early effects. The usual and unlucky connexion of the two properly distinct subjects, of green-sand and calcareous marl, and the erroneous deductions thence made, will serve as my excuse for the seeming digressive course of the preceding remarks, which were designed merely as preliminary to the answers on the Pamunkey marling.

The greater effect of the green sand marl on the clover (as seen in the first week of November,) over that of any merely calcareous marl, has been already stated. Another interesting evidence of the same is the stronger *fixing* of this grass, or making it as if natural to the soil. Dr. Braxton thinks (and acts upon the opinion) that after his marled land has been once well set in clover, the crops will continue to seed the land under his rotation, and that no subsequent sowing will ever be required. He finds, however, when clover seed is sown on this sandy soil, unless early in winter, that it is essential to its success to cover the seed by light harrowing—which he does regularly. My own former practice of sowing immediately after the passage of a harrow on wheat land, in the early part of spring, he thinks would not answer instead. He finds that the trampling of live stock is also necessary, to prevent the too great looseness and puffiness of the soil otherwise. He grazes one year in his rotation, (recently of five, and now about to be six fields,) on the clover to be fallowed the same autumn for wheat; not so closely however as not to leave a large remnant of the clover and other vegetable matter on the field.

Mr. Wm. F. Wickham's farm (South Wales) presents the oldest and most extensive, and therefore the most profitable marling practice on the Pamunkey. The great improvement made on his land generally, is the more remarkable, because he has long pursued the very severe four-shift rotation, of three grain crops in four years. But though Mr. Wickham has so long pursued this course, and has so much improved his land under it, (or notwithstanding its scourging character,) he objects much to its severity, and would prefer to add another field and another meliorating crop to his rotation. He has found, contrary to the established results as to our calcareous marls, that his marling is most improving on his originally good soils; and his limited experience of the green-sand marl on acid soil he thinks has not been very encouraging. Further, notwithstanding the happy mixture of calcareous matter and green-sand in all of his marl, he does not place so high an appreciation on the latter ingredient as he would on an equal addition to the former. He does not fear any injury to the land or crop from excess of quantity of his marl—and would not object to have a cover of six inches thick, but for the cost of applying. This opinion, alone, shows a remarkable difference of action between the mere-

ly calcareous and the green-sand marls. No where else did I hear of any injury produced by this green-sand marl, though no where else had there been applied such heavy dressings as Mr. Wickham's.

The transportation of marl by water is considered by most persons as so expensive an operation, that few farmers have yet undertaken it; and those who have engaged a supply from lightermen, have been made to pay exorbitantly, and often for a commodity of very suspicious character, if not certainly of bad quality. This much dreaded operation is shown by Dr. Braxton's practice to be a mere trifle, at least on the sheltered and calm navigation of the Pamunkey. Dr. Braxton has both the green-sand upper stratum (as general throughout) and the green-sand marl beneath, on his own land; but as the latter, which only he values or cares to use, dips there below the level of the tide, he prefers to dig similar marl eight miles higher up the river, and bring it by a lighter to his landing. At my request he furnished a statement and estimate of the cost of this labor, which will be annexed, and which I hope will be valuable both as instruction and inducement to many farmers who cannot be supplied with marl, except by water-carriage.

The answers and remarks of Mr. William F. Wickham, which will stand first, as in the order of priority of practice and experience, were not received until after the foregoing introductory observations were written, and in type. This will account for some passages which may now appear superfluous; and, also, for the omitting to refer to other subjects mentioned by Mr. Wickham. It is proper also to state that, in consequence of delay or miscarriage of the specimens selected for me, the marls of Dr. Braxton and of Mr. Carter Braxton were not received and analyzed until after the foregoing general remarks thereon were in type.

In the following statements of the constituent parts of marls, given in the notes to the answers, the proportion of carbonate of lime (or pure calcareous earth) was ascertained very exactly by means of Davy's pneumatic apparatus. The proportions of the remainder, of sand and of clay, (or finely divided earth,) when mentioned separately, were separated by agitation in water and difference of specific gravity; and of course this mechanical mode of separation is not very exact. The green-sand (said to be a chemical compound of siliceous iron, and a little pot-ash,) being insoluble in, and not affected by the muriatic acid, and being in grains, and of very nearly of equal specific gravity with siliceous sand, it remains with the latter; and the proportion of green-sand was then *guessed*, by carefully observing the mixture of the two through a magnifying glass. This mode of determining proportions, *by sight and by guess*, is altogether too rough and inaccurate to be relied on for exactness, and therefore it is proper thus to explain the mode of examination, and to confess its faultiness. However, as the grains of green-sand are black and opaque, (when seen in grains) and the siliceous sand is white and crystalline, the distinction and contrast are so marked, that it is not difficult to approach to something like the relative proportions even by the eye.

As thus examined, the contents of green-sand, in every case, fell below previous reputation; and the calcareous matter in a still more remarkable

degree, in the green-sand marl used by Dr. Braxton and Mr. Carter Braxton. And the less the strength of the marl in calcareous matter, the more remarkable are the effects produced and reported; and the more important and valuable the use, and the more is required full and proper investigation of the qualities, and accurate experiments of the operation and effects of the other ingredient—the mysterious substance, green-sand, of which it may be truly said that all that we yet know is, that we know nothing. In regard to the most interesting and important of these marls, (on account of its extensive application,) that from G. W. Bassett's land, used by Dr. Braxton, the calcareous ingredient is so small (only 11 per cent.) that I think the specimen sent to me could not have presented any thing like a fair average of

quality, as it certainly was selected for. But all that the operator can do, by analyzing, is to ascertain accurately the amount of carbonate of lime in the particular specimen presented to him; and therefore as much depends upon the care and judgment used in selecting specimens, and the mode of taking them, and their amount, as afterwards upon analyzing them, to enable the operator to state truly the average strength of any layer or body of marl. It was Dr. Braxton's opinion that this marl contained three times as much calcareous matter, as this specimen produced. The whole mass, after being dug, and mixed by loading and unloading the vessel, as I saw the marl at Chericoke, is very uniform in appearance, and the shelly matter is generally so finely divided as not to be distinguished by the eye.

QUERIES (REPEATED FROM PAGE 489) TO ASCERTAIN THE ACTION AND EFFECTS OF SHELL MARL AS MANURE, IN GENERAL, AND ANSWERS AS TO THE GREEN-SAND MARL USED ON THE PAMUNKEY RIVER LANDS.

1. When was the use of marl as manure commenced on your farm?
2. Whose property was the farm, and under whose direction was its general management, (if not your own,) then, and since?
3. What was the quantity of cleared land on the farm then ready for and subjected in its turn to cultivation of any kind, exclusive of all waste ground?
4. What is the quantity since added, by new clearings of wood-land, or other waste spots brought into tillage? And, generally, was the land thus added richer or poorer than the present average quality of the farm?
5. What was the rate of progress in extending the marling—and, altogether, how many acres have been now marled?
6. What was the usual strength of the marl used, or its proportion per cent. of carbonate of lime, or pure shelly matter?
7. Was there any peculiar quality or ingredient, besides the carbonate of lime, that served to give additional value to the manure—as “green sand,” or gypsum, or a large proportion of fine clay, &c.?
8. Or was there any thing that served more than usually to lessen the value, as stony hardness of many shells, or of masses of marl, &c.?
9. What have been the usual quantities of marl applied to the acre?
10. Have there been made trials of any *much lighter dressings* of marl than the usual quantities—and if so, what were the results, compared to the usual quantities?
11. Have there been made trials of any *much heavier dressings* than the usual quantities—and with what comparative results?
12. Was the cropping and general management of the land, *for a few years immediately previous to its being marled*, such as might be considered *meliorating* or *improving*, (or at least as *preserving* its degree of fertility,) or was it *impoverishing*, and wasting of fertility in general? State the rotation of crops, if known.
13. The same question as to the few years immediately after marling, and since.
14. What have been the usual and general results of the applications of marl, on the increase of the crop next following, on land in different conditions—and afterwards to the present time?
15. Have the earliest fertilizing effects of marl (or the increased product of the first crop, or first course of crops in the rotation,) been subsequently increased or diminished by lapse of time—and in either case, under, and in proportion to, what circumstances?
16. Is it your opinion, whether founded on experience or observation, that the early increased product of your marled land (say for the first three or four crops, or of any number you have yet made thereon,) will be subsequently diminished, under any rotation of crops, or course of cultivation, that would not have been decidedly exhausting and injurious to the land, if marl had not been applied?
17. Has sterility, or other damage, been caused on any part of the land, by applying marl too heavily, or in any other manner—and under what circumstances of soil, tillage, &c.?
18. Has it been found that any other manures, either vegetable and putrescent, or mineral, are more efficacious, or durable, on poor natural soils *after* marling them?
19. What do you suppose was the average productive power, in corn, per acre, of all your now arable and cultivated land, before marling?
20. What do you suppose is the present average productive power of the same in corn?
21. What was the usual or average quantity of the crops of wheat made annually on the farm before marling, and recently?
22. Taking such general grounds for the estimate as may be satisfactory to your own judgment, state what you suppose to be the annual value of the present *general* or *average gross product* of grain, or other marketable products of the fields in cultivation, of the land marled, caused by, and owing to marling—per acre, and also in total amount annually from the whole farm?
23. Does your experience or observation serve to contradict any of the important theoretical opi-

nions in regard to the action of marl, or statements of actual results in practice, as presented in the "recapitulation" embraced in pages 53 to 56 of 'Essay on Calcareous Manures'—and if so contradicting, in what particulars?

I. Answers to the queries on the use of marl by William F. Wickham, of Hanover county, in regard to his South Wales farm.

Answer to 1st query.—The use of marl was commenced on my plantation in 1820.

2d.—It was my property, under the general management of an overseer, subject to such orders as I gave on occasional visits till 1827—from which time I have been residing on it.

3d.—There were, when I began to marl, about 600 acres cleared on the plantation. I have since added by purchase 400 of open land, making in all 1000 acres, consisting of Pamunkey low-grounds and second low-grounds or table land in cultivation.

4th.—I have cleared some 15 or 20 acres of the same description, but inferior originally to the rest of the plantation.

5th.—The annual progress in marling has been irregular. Less was done by my overseer than has been done by myself since my residence here. I have now marled upwards of 900 acres.

6th.—The proportion of carbonate of lime in my marl I estimate at 45 per centum—a rough analysis gave about that amount.*

7th.—It contains green-sand, but in what proportion I have no means of ascertaining. Some beds appear to abound more in it than others, and different parts of the same bed to have it

in unequal quantities. There is also an efflorescence on the marl, and on the superincumbent green-sand, that has a bitter astringent taste resembling that of alum. I do not know there is any gypsum in it.*

8th.—We find masses of shells and earth conglomerated and as hard as stone, but too few to affect the value of the marl; they are never carried into the field except by accident.

9th.—The quantity of marl I have used to the acre has been from 600 to 1200 bushels, generally about 800, and often at the rate of 2000 or 3000.

10th.—I do not think I have ever used less than five or six hundred bushels to the acre.

11th.—When I have put 2000 or 3000 bushels on the acre it has been on land that was highly manured, and I never perceived the least injury from an excess of marl. The land to which these large quantities were applied has continued in the greatest state of productiveness. Perhaps a smaller quantity might have proved equally beneficial for a time; but as a permanent improvement, where the land was originally good, or other manures can be used with the marl, I prefer as much as I can carry on the land.

12th.—Before I commenced marling the plantation was cultivated on the old three-field system—corn, wheat, pasture; no clover, and but little manure made. It was generally in a state of extreme sterility.

13th.—The improvement from marl was apparent in a year or two, and has been regularly progressive.

14th.—Its effect on the first succeeding crop was slight, except on cotton, where it acted immediately and with great benefit. It was generally spread on land intended to be sown in wheat or planted in corn. On the wheat that followed corn, clover was in every instance sown, and the first decided advantage was to the clover crop. The stronger the land the more apparent was that benefit.

15th and 16th.—The earliest fertilizing effects produced by marl, and the addition to the crops arising from its use, have been constantly augmenting in a rapidly increasing ratio, so that every year adds to my opinion of its value; so far am I from apprehending the increased product is likely to be diminished, that, on the contrary, from an experience of twenty years, I am satisfied, with my imperfect husbandry, the land on which it was first used (as well as all the rest to which it has been applied) has been constantly improving, and will continue to do so.

* Both alum and copperas, (sulphate of alumine and sulphate of iron,) intermixed, are so abundant in some of the over-lying earth, that a thin crust of these salts is to be seen on the outside, left by the drying of the slowly oozing waters. The taste gave sufficient evidence of the kind of these salts, as the sight did of their existence and source. And as the contact of either of these salts with shells could not fail to form sulphate of lime, (gypsum, or plaster of Paris,) it is equally certain that some of the latter substance must be in those parts of the marl, until dissolved and carried off, though there is no appearance of it to the eye that could be relied on.—E. R.

* Three specimens of Mr. Wickham's marl, selected from bodies which he had mostly used from, and which he supposed presented fair averages of value, were afterwards analyzed, and found to contain the following proportions:

No. 1. Shell marl, blackish when moist, from upper part of bed, in Barn field, back from the river, consisted of carbonate of lime	32.50
Silicious sand and green-sand together (the green-sand judged by the eye to be about two-fifths of this residuum, or 22 grains,)	56
Dark gray clay, and loss	11.50
	100

No. 2. Blackish shell marl (like the preceding) from the lower part of bed near river bank, consisted of carbonate of lime	44
Silicious sand and green-sand (of which the latter appeared to be about one-fifth of this part, or 8 grains,)	39
Dark gray clay and loss	17
	100

No. 3. Light colored, (yellowish or reddish,) shell marl forming the stratum above the preceding (No. 2.) consisted of carbonate of lime	86
Silicious sand and green-sand, (of which the latter appeared to be one-tenth of this part, or) - - -	47
Yellow clay and loss	17
	100

There can be no doubt there is no manure more permanent; but for the use of marl, I am convinced my land, under my severe cropping, would have been reduced to a lower condition, if possible, than it was in when I began its use.

17th.—Upon a few acres, not more than five or six, of sandy gravelly hill-side, I have seen the corn I think injured by marl. The stalks in the spring grew larger than before, but they fired early, and in many cases produced no ears. The land was unimprovable, and not worth the cultivation. It looks rather better than formerly, and produces meager crops of corn and oats, but does not pay for the labor, which, however, is trivial, that is bestowed on it. I do not remember that I have sown clover on this piece of land—here I suppose 800 bushels of marl were used to the acre. On no other spot do I perceive that damage has been done by too much marl.

18th.—The effect of putrescent manures has been very much increased by the marl. I do not know that the first crop has been much better; but the improvement from their use has thus been rendered permanent. My practice is never to permit these manures to be turned in without accompanying them with a heavy dressing of marl. Plaster of Paris acts on clover, when the land has been marled, with wonderful efficacy. The result of an experiment I made will be found in the 4th Vol. of the 'Farmers' Register,' p. 579. My subsequent experience confirms that experiment.

19th and 20th.—The average crops of corn per acre before I began the use of marl did not exceed three or four barrels—they are now from six to eight.

21st.—The wheat crop has varied so much, even on the very best lands in this part of Virginia, depending, as it would seem, much more on the season than on the cultivation or soil, that it is difficult to state an average; but I think the increase has been in an equal ratio with the corn crop.

22d.—The increased product of my land from the use of marl, aided by a somewhat improved agriculture, I estimate at from 50 to 100 per centum. The effect of the marl has been increased by the application of large quantities of manure from every source from which it could be derived.

23d.—My experience in no manner conflicts with any thing I remember in your 'Essay on Calcareous Manures.' Sorrel I have seen growing even on piles of marl; but after it has been incorporated with the soil the sorrel certainly disappears. I will not undertake to say whether this is owing to the chemical action of the marl on the land or to its promoting the growth of other plants, clover for instance, that eradicate the sorrel; but the result is as I have stated it. I have attended rather to facts than to theory, not giving myself much concern about the *modus operandi*. If my observations are in any manner inconsistent with your views, you will find them mentioned in this communication; but I am not apprised there is any discrepancy.

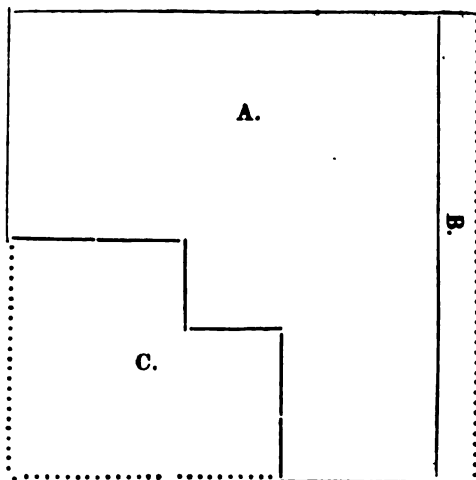
Here permit me to bear testimony to the accuracy and the great value of your 'Essay.' It has been of incalculable benefit to all the calcareous region of lower Virginia, (to which however it is

by no means confined,) and the effects of your zeal must continue for generations. I know of no treatise on any branch of agriculture so valuable and so complete.

In the use of marl, I have directed my attention but little to minute experiments, being satisfied with general results. The whole character of the soil, and of the estate on which I have used it, has been changed, and no passing observer can fail to be struck with the difference of the land to which it has been applied, and the surrounding country where it has not been used. In the progress of the operation the limits of the marled land have generally been defined with the greatest precision; so that the transition from barrenness to fertility has been marked as if a line had been drawn.

I said the marl with apparently the greatest proportion of green-sand had proved the most efficacious. The following is an extract from a memorandum made at the date it bears. The land to which it relates, about fifteen acres, was much exhausted, and is at this time in the highest state of improvement. Here and there, on the weaker spots, a small quantity of putrescent manure has been used, but not to the extent of one-tenth part of the whole. Clover has always been sown on it at that stage of my rotation that permitted it. The land is slightly undulating.

Extract.—"1830, May 10th.—The most remarkable effect I have ever seen from manure, [meaning marl,] is on the clover crop, in the river field at the Lane. It was marled in the summer of 1828, then fallowed and sown in wheat—and clover was sown on it in the spring of 1829. The marl shows its effect in this manner—



"A. Marled throughout, well taken in clover, and a heavy crop in the bottoms.

"B. Half a bed not marled and scarcely any clover.

"C. Not marled and very little clover, though as much seed was sown on B and C as on A. The difference between the marled land and that not marled, can now be distinguished to a line as far as the field can be distinctly seen. The upper end of the field (not included in the above experiment,) was manured from the farm-yard. It

produced better wheat than the marled land, but is far behind it in clover."

The lines, above represented, have been many years obliterated, the whole field having been marled, and it is now in a state of uniform fertility.

I am in favor of using large quantities of marl, especially if the land be in good heart, or other manure can be applied with it. Yet, in many instances I have perceived no difference between the effects of 600 bushels to the acre and three times as much. The most fertile soils (in Europe) are represented as containing 20 per cent. of calcareous matter—and, considering marl as acting almost entirely by virtue of the lime it contains, it would take ten thousand bushels of my marl to give 20 per cent. of carbonate of lime to a soil ploughed seven inches deep. I therefore have no fear of using too much marl. The following experiment justifies this opinion. Some years ago, I carted a large quantity of marl into a pile near an old barn, intending to mix it with the rubbish and scrapings around, and then to spread it on some of the contiguous land. Before I had done so, it occurred to me to permit a part of the pile for 2 or 3 yards square to remain undisturbed and to plough it with the rest of the land. Nothing was put with the marl; but some dirt without doubt was mixed with it in the operation of ploughing. The depth of the heap was from 8 to 12 inches. It was planted with corn and cultivated with the surrounding land. The whole piece produced a very heavy crop, and the corn on the pile of marl was equal to the rest. I perceived no difference in the wheat that followed. It is now covered with clover and weeds, and on their being removed, has at this moment the appearance of a heap of marl with a slight mixture of dark earth. Anderson, in his essay on lime, speaks of a similar experiment. In a part of his field a large quantity of lime from some accident was suffered to remain in a heap, not spread, but mixed with the soil by cultivation, and the improvement was very great.

The marl I use probably contains some remains of the animal matter besides the shells.

There are frequently several feet of green-sand earth, without shells, above the marl. This I have uniformly thrown aside without using it. The green-sand mixed with the shells is exactly like that lying above them. I have never applied that which is without the shells.

I will mention a few of the general rules that have governed me in the application of marl:

Never to use less than 600 bushels to the acre.

Not to expect much benefit from it till clover has been sown.

To sow clover seed invariably on marled land when the rotation permits it.

If the land is strong, or well taken in clover, or putrescent manures can be used at the same time, never to fear putting too much marl on the land.

To carry marl on manured land before it is put in a crop; in other words, never to use other manure without marl.

To sow plaster of Paris on clover on marled land.

To cut but little clover, and that on the richer spots—not to graze too close, and to turn under as much clover as I can.

To have, whenever it can be done, vegetable matter ploughed in with the marl. To these rules I endeavor to adhere.

Much less marl than I have used, would for a time perhaps be equally efficacious. My beds are generally so convenient to the fields that I have carried out larger quantities than I should otherwise have done.

A small spot—about an acre of land in broom straw that had been turned out, as I supposed, from exhaustion, I once marled, and it has since produced excellent crops—about 8 barrels of corn to the acre. Perhaps it was in better heart than it appeared to be.

The 15 or 20 acres of land I mentioned as being cleared by me have been constantly improving.

I have given a heavy dressing of marl a second time to land that had been much improved by a previous marling, with great benefit.

Of the effect of green-sand alone, I have no experience of my own.

Near two years ago, I was in New Jersey, and saw at a depot, on the canal near Princeton, green-sand, there called marl, that had been brought from the interior of the state and up the Delaware a distance of some forty miles, was sold at the depot at 12 cts. the bushel, and then carted as I witnessed more than two miles, and I was informed much further. It contained no shells and resembled exactly our green-sand, so much so that a parcel I brought home got blended with parcels from my own bank and from a neighbor's, and I could never distinguish which was from New Jersey. A high value must have been placed on it from the price it cost and the distance it was carried. I was not long enough there to learn any thing of the manner of using it, or the quantity put on an acre.

My marl I have tried on poor sandy forest land, (not included in the above account) but without manure and clover, and without mixing it with the soil by cultivation, only a crop of oats having been taken from the land. It is long since the land has been disturbed [by the plough]; but it does not appear to have improved to any extent. The great impediment to the improvement of my land is the execrable rotation I pursue—three grain crops in four years. I hope to correct it, but must first have more arable land. Many of the experiments I have detailed would lead to various speculations, but I will not pursue them. No one has more reason to be satisfied of the immense advantage resulting from the use of marl than myself. I have avoided all exaggeration, and have rather underrated its importance.

Several of my neighbors have used marl with much advantage. I will name Mr. James T. Sutton, Dr. Wm. R. Nelson, Mr. Joe. Spotswood Winfield, Mr. Goddin and Mr. Campbell. These gentlemen I have no doubt could communicate valuable facts to you. Mr. Edmund Winston, a very skilful and successful farmer, hauls marl eight miles to spread on his land.

This desultory communication made at your request I feel satisfied presents no new views. I do not hope to add to the information that you have given to the public, but being conscious of the great obligations that I, with every one engaged in the same pursuit, am under to you, I could not disregard the wishes you were so kind as to express. This is my only apology for occupying so much of your 'Register.'

Nov. 19th, 1840.

II. *Answers by Dr. Corbin Braxton, of Cheroke, King William county.*

Answer to 1st query.—The use of marl at Cherokee, the farm on which I reside, and to which these answers will be confined, was commenced in 1834.

2d.—The farm was my own then, and since.

3d.—The quantity of cleared and cultivated land then about 500 acres.

4th.—About 50 acres since added, generally of waste spots, and poorer than the other. In all now 550 acres.

5th.—About 60 to 70 acres marled annually, and about 400 acres now covered. All the marl brought eight miles by water, on a camel lighter, from the lands of Geo. W. Bassett, above. My own marl dips so much as to be lower than the level of the water of the river.*

6th.—According to Professor Rogers' analysis and report, this marl has 34 per cent. of calcareous matter. The marl is friable, and the calcareous matter finely divided.†

7th.—This marl also contains, according to Professor Rogers, 24 per cent. of green-sand.

8th.—Nothing contained in the marl to lessen the value.

9th.—The usual quantities applied from 200 to 300 bushels per acre.

10th.—As little as 100 bushels to the acre I have applied with benefit; but not so great as the larger quantities.

11th.—I have never, that I am aware of, exceeded 300 bushels to the acre. The result was better than a lesser quantity, but this superiority was evidenced more on grasses than on grain. Wherever enough *green-sand-marl* (mark the expression‡) has been put, the weeds, after the first year of the growth, are eradicated, and if there is not enough red clover seed in the ground to occupy the land, the surface is covered by white clover, without any seed having been sown.

12th.—The previous cropping was meliorating, so far as some red clover, an abundant crop of weeds left to die on the land, and what other putrescent manure we could prepare on the farm, could make it. The five-field rotation had been pursued for two or three years before I commenced marling, (1. corn, 2. wheat or oats, 3. clover, fallowed, 4. wheat, 5. pasture not closely grazed.) Before that the common three-field rotation had obtained.

* An estimate of the expense of the digging, transportation, &c. of this marl, was prepared at our request, and will be inserted in a subsequent part of this number.—ED.

† The only specimen furnished contained:

Carbonate of lime	-	-	-	11	grs.
Sand, coarse,	-	-	-	82	
Of which about one-third, or 27 grains					
was of green-sand.					
Dark gray clay, (or finely divided earth,) and loam	-	-	-	7	

100

See remarks on this specimen, p. 683. E. R.

‡ Meaning a calcareous marl, containing also green-sand.—ED.

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13th.—The same five-field rotation has been continued since marling, but is about to be changed to six-fields, by the introducing of a pea-crop. The partial grazing, in the year preceding corn, is deemed more beneficial than injurious to the subsequent product, as the light soil needs the treading of stock.

14th.—The corn crop on the poorer land, next succeeding the marling, I think has been increased from 100 to 200 per cent. On the better land about 100 per cent. The land, judging from its appearance and the crops raised, has continued to improve afterwards; but with my rotation and the short time I have been at it, I have not had an opportunity of observing many second crops of corn after the marling, and the Hessian fly invariably destroys my corn-field wheat.

15th.—My experience (on the farm on which I live) with marl has been too limited to answer this query satisfactorily; but as far as I can judge, the early effects have certainly been greatly increased afterwards.

16th.—I have no expectation of any future diminution of the rate of produce already derived, under the circumstances by me stated, or supposed in the query.

17th.—Being anxious to get over the whole surface of the farm as early as possible, I have never marled as heavily as the land could bear of green-sand marl, perhaps by two-thirds, or three-fourths—and, therefore, I have no damaged or marl-burnt spots. But our county presents much of such effects; which are generally found on gravelly knolls, whether of light or stiff soil, and where most devoid of vegetable matter. But this damaged land, so far as I have seen, is all easily reclaimed, and made rich, by a free application of vegetable matter, or other putrescent manure—but the animalized manures acting decidedly better than the purely vegetable.

18th.—All vegetable manures have acted better since marling than before, and, as far as I can judge, are durable, and the land looks rich after their use; whereas, before marling, on the light soils, the effect of the putrescent manuring generally passed off with the first crop. Before marling, gypsum had good effect on clover, and also on turnips. But after using the green-sand marl, gypsum had no perceptible effect, as it seemed to be surpassed in effect, and superseded by the green-sand ingredient.

19th.—Before marling, my fields averaged from 15 to 20 bushels of corn per acre.

20th.—My corn crop for the last three years averaged 40 bushels, being all on marled land. This year is included, supposing that it will certainly produce at least as much as the two former.

21st.—My crops of wheat have more than doubled since I have been fallowing, but I have not as yet had a fair opportunity of judging the effects on marled land fallowed, as my fields are just now coming in rotation, this being the first year of fallowing proper after marling. As before stated I cannot make wheat after corn, on rich or poor, marled or unmarled land.

22d.—If the price of corn be put at \$2.75 the barrel and wheat at \$1.20 the bushel, I suppose the increase of grain, from marling, to be worth

\$8.60 for each acre under grain crops, and nearly \$2600 on the farm each year, for grain alone. Parts of several fields (amounting as above stated to about 150 acres) are yet to be marled, and of course have added nothing to this product. My gross products, as well as the net, are very much better than they formerly were under the three-shift rotation, although I now cultivate but one-sixth of the surface, whereas formerly it was one-third.

23d.—As far as my observation and experience have gone, I have seen nothing to contradict, but on the contrary every thing to confirm the theoretical views advanced by you respecting the action of marl, in the 'Essay on Calcareous Manures.'

November 4th, 1840.

III. Answers of Carter Braxton, in regard to Newcastle farm, Hanover.

Answers to 1st query.—The first marling was done in 1832, or '33. But this is conjecture.

2d.—When marl was first used on the farm I own, it was the property of Mrs. E. Ruffin, from whom I purchased in 1837; it was under her management before then, and my own since.

3d and 4th.—The cleared land was then about 750 acres; and none of any consequence has been added since.

5th.—In 1837, when I took possession of the estate, I found about 120 acres marled. Since then, I have marled about 230—making in all 350 acres.

6th.—I am wholly unacquainted with the proportions of component parts of the marl.

7th and 8th.—The upper stratum of our marl banks, for 3 to 5 feet in thickness, appear to be very full of shells, and some masses of them are very hard. Below that, for any known depth, as none of them has been yet penetrated to the bottom, there is a good deal of shell, some entire and the rest in fragments, mixed with the marl. The color of our marl in the bank is bluish; but that below the top stratum, soon after coming from the pit, has a greenish complexion, when looked at against the sun; and all of it is supposed to contain a large proportion of green-sand. The immediate effect of this marl is equal to what could be expected of any marl.*

* The specimen of upper stratum contained:

Carbonate of lime	-	-	-	36	grs.
Sand, part coarse, principally fine,	-	-	-	86	
Of which about one-fourth, or 9 grains,	-	-	-		
was green-sand.	-	-	-		
Gray clay, (or finely divided earth,) and	-	-	-		
loss	-	-	-	28	
				100	

The specimen of lower stratum, containing but few and small fragments of shells, consisted of

Carbonate of lime	-	-	-	2	
Sand, fine	-	-	-	76	
Of which about one-tenth, or 7½ grains	-	-	-		
was green-sand.	-	-	-		
Gray clay, (or finely divided earth,) and	-	-	-		
loss	-	-	-	22	
				100	

9th, 10th and 11th.—From 250 to 300 bushels usually applied. A portion of my present corn field received only 175 bushels to the acre, a third less than the usual quantity—the soil on which this smallest portion was put, in appearance was no better, if as good as that on which more marl was placed; but the crop of corn now looks equally good, if not superior, to that with the largest portion. No experiment with a larger portion than 300 bushels.

12th.—It may be said that the cultivation was meliorating. The farm was in four fields—the number of stock small—and the land kept under the inclosing system; but the land generally produced nothing else than weeds; in some spots, bird-foot clover—the second year after cultivation the land put up in stick-weed, which overcame every other grass and weed. In my opinion, this is a system that adds nothing to our lands.

13th.—Since marling I have kept the land in four fields—have grazed much more heavily than my predecessor; but have sown clover on all the marled land, which has always flourished luxuriantly.

14th.—The effect has been an increase of from 50 to 100 per cent., according to the condition of the land before marling. I have cultivated no land, that I have marled, but once; I have this year cultivated 40 acres in corn, that was about the first marled land on the farm; it was not represented to me as being extraordinary for fertility when I purchased, and I think the crop is now at least equal to 8 barrels: this land I clovered, the year I purchased. I have no doubt, from my best observation, that the improvement of the marled soil is progressive every year: but I am fully convinced, that the improvement is greatly augmented by the use of clover, which gives additional fertility to the soil every day it remains on the ground. A farmer that neglects to clover, derives only half of the benefit he otherwise would from marling. It has been said "without clover, no manure—without manure, no corn, wheat," &c.; we may say here, "without marl, no clover, and without clover, no corn, wheat, &c."

15th.—The earliest effects have increased; from but one experiment, I speak, however—and from all the observation I can bestow, that will be the invariable result.

16th.—I have never witnessed any diminution of the early product—and from all that I can conjecture, none can be apprehended in all future time.

17th.—I know of no injurious result of marling, in any instance on my own land.

18th.—I have never used any other mineral manure. I think I may positively assert, from my limited experience, that putrescent manure is more durable after marling. I am not determined whether it is more efficacious on the first crop.

19th.—The product before marling, on an average, was hardly fifteen bushels of corn per acre.

20th.—The present productive power of the same

Average of the upper and lower stratum, if equal depths are used:

Carbonate of lime in 100 grains	-	-	18½	grs.
Green-sand	do.	-	8½	

E. R.

land I suppose to be fully thirty bushels of corn per acre.

21st.—The ravages of the fly have been such, for the two last years, that no data can be obtained from the crops of wheat of those years. In 1838 I reaped at least 14 bushels to the acre after corn; that crop was seeded entirely on marled land. I marled and manured a lot of 9 acres in 1839, and planted it in corn, the product was 84 barrels—the corn measured in June, the year after it was made. The same lot was seeded last fall in wheat, and although it seemed to be destroyed in the spring by fly, yet it yielded 102 bushels of wheat that weighed 61 lbs.

22d.—The increased product of corn is worth fully \$9 per acre—\$2,000 corn crop alone. The wheat, as has been observed, having been too unproductive to furnish any data for an estimate.

23d.—I know of nothing to contradict the "recapitulation" in the 'Essay on Calcareous Manures;' but every known result corroborates the deductions of that work, which gave birth to a revolution in the agriculture of our country, that will be ever memorable in its annals—and place its author among its greatest benefactors.

November 5th, 1840.

IV. *Answers of Williams Carter, in regard to the applications and effects of green-sand alone, on his Broad Neck farm, Hanover county.*

*Broad Neck, Hanover Co., }
Nov. 23d, 1840. }*

In answer to your queries upon the subject of green-sand, I have it in my power to state, with considerable accuracy, the results of experiments made with that manure.* Four years ago, in the spring of 1836, before planting, I carted upon a belt of land, running diagonally through the field designed for corn, green-sand, to the amount of about 1000 bushels to the acre. The belt, 10 feet wide, was run in a diagonal direction, so as to embrace three distinct varieties of soil, in order that I might ascertain which it would most benefit. At one end of the belt, the land is a coarse, yellow sand, poor, and fit only for corn, and producing that in but small quantities. In the middle, the soil is good, producing corn, wheat and clover very well. The other extreme runs gradual-

* This reference is to the queries published in 1837, in connexion with the general queries on marling, (recently again submitted to Mr. Carter,) and which were as follow: (Far. Reg., Vol. V., p. 511.)

"Additional queries, addressed to persons who have used green-sand earth, not calcareous, or not effervescent with acids.

Query 1. In what quantities have you used the earth called "green-sand" per acre?

2. On what extent of surface, and for what length of time?

3. On what kind of soil—and, especially, as to whether naturally rich or poor, and whether marled or not—has this manure been operative, or of no effect?

4. What crops is it beneficial to, and on what has it little or no effect?

5. Is its beneficial effect durable or transient—and to what known extent?"

ly into a "livery," white, cold soil, producing, tolerably well only, our usual crops; much inferior to the middle, but better than the first portion. The green-sand was spread evenly over the surface of the belt, which had been marked off distinctly with a plough—the corn planted over the whole field, and all treated alike. I plough but one way, drilling the corn. I also put green-sand into a few hundred hills of corn in another part of the field, and some time after, in planting cotton, gave a good allowance to alternate rows. During the whole of the summer of 1836, I watched the growth of the corn and cotton in hills, drills, and belt, but found no difference between that which had, and that which had not the green-sand. In October, the field was sown in wheat. The spring of '37 came, but along with it no improvement in the wheat; on the contrary, it was decidedly injured—killed out; and the ground wore the appearance of being under the influence of frost, even as late as the month of April—looking spongy, spewed up. From this time, I thought no more of green-sand, till my return from the Springs, about the 1st October, when I discovered from my house, which overlooks the field, that the carrot weeds on the afore-mentioned belt very far overtopped their neighbors. Upon examination, I found the white clover and volunteer red (having sown no clover this year) much better than elsewhere, and made up my mind that green-sand was a good thing for the clovers, if not for grain. In the spring of 1838, the poorest and most sandy parts of the belt put up a smart sprinkling of the bird's foot clover; the better, but still sandy part, as it encroached upon the really good land, had a most magnificent growth of white clover, (which was never seen there before); and on the balance of the belt there was a very fine crop of both white and red, varying with the quality of the land—much inferior on the whiter land, and where decidedly white and cold, no improvement at all. The belt, originally but ten feet wide, had now, by frequent ploughings and harrowings, during the cultivation of the corn and sowing of the wheat, spread out to fully 20 feet; and seeing the clovers as good at the margins as in the middle, I concluded I had wasted labor in putting on the green-sand too thick; therefore in the following year reduced the quantity to 600 bushels the acre. Spring of 1839—same field in corn—carried out and spread, as near as could be, 600 bushels green-sand to the acre, on about 25 acres, the belt included—crop fine throughout; saw no difference in any part of the field, not even on the belt where the clover was so fine, but which had been grazed down with the rest of the field the previous autumn. Sowed wheat in October—crop promising in spring, 1840, but lost by rust—no difference between the green-sand part of the field and other parts as to rust—observed no spewing up of the earths like that by frost, as formerly; perhaps owing to the smaller application of green-sand. In the spring, 1840, sowed the whole field with red clover seed; the growth most wonderful where the green-sand was used, and in the strong land during harvest a stroke of the cradle would take in as much clover, nearly, as wheat. White clover wonderfully luxuriant, and the entire 25 acres at this day exhibit marks of great improvement, with the exception of a few ends of rows running into the white land.

It is worthy of remark that contiguous to the land already described as having received the green-sand, there were about 30 acres resembling it originally, but much impoverished by cultivation, upon which a very liberal supply of farm-pen and stable manure was spread at the time the other received the green-sand preparatory to planting corn. On both these parts of the field the corn was equally good—the succeeding crop of wheat however was much more promising, before the rust took it, on the manured part; but the clover very inferior to that which grew where the green-sand was spread. This appears a strong proof of the excellence of green-sand as a manure for clover.

Thus, Mr. Editor, have I answered four of your queries, and I hope at a future day, to be able to testify as to “the permanency of the beneficial effects of green-sand,” which constitutes your fifth and last query.

Very respectfully,

your obedient servant,

WILLIAMS CARTER.

Concluding Remarks by the Editor.

The preceding interesting communication on the use and effects of green-sand alone was not received until the 25th of November, after all the foregoing remarks and answers were in type. The facts stated deserve the attentive consideration of all who desire to understand the action of green-sand. No particular comments will here be offered; and it will be left to readers to draw their own inferences as to whether the effects just stated are most in agreement with my views before presented, or with the more authoritative and more prevalent opinion of this earth being a general fertilizer.

One more statement of practice in regard to both the early and later effects of green-sand, without any calcareous admixture or accompaniment, will be added—and which, indeed, is the only such fact known, except of my own former practice and experiments, on the general results of which have been founded the opinions stated at page 680, and in various previous parts of this journal.

The early effects of the trial referred to, were communicated by Dr. Braxton to the *Farmers' Register*, more than four years ago, and may be seen at page 277 of Vol. IV. After mentioning several smaller and less careful experiments with green-sand as manure, which, though generally producing good effects, and therefore encouraging the repetition, were not of a decisive character—because not entirely separate from calcareous matter, and, moreover, not observed beyond the early results—he proceeds thus to describe what may be considered as an accurate as well as a long continued experiment:

“But the most decided proof of its beneficial effects, was evidenced on cotton. I selected, as I thought, the poorest spot on the farm where I reside, the spring of 1835, (being a part of one of those cattle-starving, comfort-killing appendages, called a standing-pasture,) and fallowed up a few acres which I put in cotton; the whole was manured in the drill with coarse litter. On about 3 acres, the litter in the drills was top-dressed with

green sand at about 100 bushels to the acre; but I should observe, that this green-sand was of an inferior quality to that used with the celery and corn, not being from the same deposit, and being the upper, or overlying stratum of the tertiary formation, containing about 80 per cent. of green-sand and 5 of gypsum, most of it having no lime at all. On another acre, old ashes in about the same proportion were applied, in the same way, and the cultivation was precisely the same on these 4 acres, as on the rest of the patch. Where the green-sand and ashes were put, I could see no difference; but between that, and where no manure [green-sand] or ashes were put, it was as *five to one*, or more. Where the green-sand and ashes were applied, the cotton was of fine size, and as well branched and balled as I ever saw cotton, while that of the other was small and trifling—scarcely worth any thing.”

The ground which was the subject of this experiment, after being in oats the following year, (1836,) has since, together with the field in general, been returned to its former use of standing pasture. I saw the place during my recent visit to Dr. Braxton, and under his guidance. There was a very thin sprinkling of red clover over the field generally, and this was somewhat thicker, and therefore the land might be considered as better, on the site of this former manuring than elsewhere. But this difference was so slight, that neither of us could trace any part of the former outline of the manured part, by the difference of the stand of clover, or by any other mark of superiority.

Neither was there any difference perceptible between the two parts manured severally by 100 bushels of drawn ashes and by 100 bushels of green-sand earth, containing (according to Professor Rogers' statement) 80 per cent. of pure green-sand and 5 per cent. of gypsum to the acre; and indeed it had been forgotten, and could not be recollected, on which side of the lot the two different manures had been used. Allowing every thing that can be now claimed by the most sanguine or confiding advocate of green-sand, the present superiority of the land so manured cannot exceed fifty per cent., if indeed it be so much; which is a diminution of seven-eighths, or more, of the superiority shown on the first crop. Moreover, of the small superiority still remaining, over the unmanured surrounding field, it may be questioned whether a part of it is not due to the 5 bushels of gypsum to the acre, even if all the effect of the rough putrescent manure be (as I can well believe) entirely at an end.

If no other benefit should grow out of this publication, and the suggestion of these doubts of the truth of scientific *dicta*, it is hoped that it will impress on the farmers of this region the high importance of testing, by accurate and numerous experiments, the value, and then ascertaining the kind and the limits of action, of green-sand as manure. In a single year, by multiplied experiments on various soils, different crops, and under different circumstances, all dispute and obscurity could be removed as to early effects; and by continued observation of the same experiments, or a sufficient portion of them, a few years' time would apply the test to the degree of permanency of effect. If such had been the course advised, and acted upon, when public attention was first drawn to the

existence of green-sand in Virginia, instead of a general confidence being yielded, without trial or proper evidence, in the asserted marvellous effects, the important facts would already have been proved; and the true value of green-sand might have been known and availed of—and the false and delusive opinions dissipated, and no longer allowed to lead to erroneous practice and loss. Such a course of experiment, on this, as on various other subjects, might well have been an effect of the labors of a Board of Agriculture, if the "penny-wise and pound-foolish" policy of the Virginia legislature, or its penny-saving and pound-wasting usage, had not refused even that humble and low-priced aid to agricultural improvement; and such a course of judicious experiments, even if limited to this one subject of green-sand, would have been more productive of information, and of profit, to the state, than all the discoveries and speculations to be found in the state geological reports, upon that and every other subject of research, put together.

TRANSPORTATION OF MARL ON THE PAMUNKY RIVER, AND ITS EXPENSE.

To the Editor of the Farmers' Register.

Chericoke, Nov. 6th. 1840.

In connexion with the reports on marling, which you are now in the progress of publishing, it may not be without its use to some, to give you a detailed statement of the expenses attending the same, as the process is carried on by me; for I am satisfied many are deterred from the use of marl, when not having it on their own farms, from an erroneous idea of the supposed expense, in procuring it elsewhere. Whatever opinions may have been elicited, or whatever consideration the subject may already have attracted, every day's experience convinces me more and more, that the value of calcareous manures is not sufficiently appreciated, in the tide water regions of Virginia, or indeed I may add in all eastern Virginia, nor do I think it will be, till persons try the experiment for themselves. In this county, much good has already been done by marling, and there is certainly an increasing interest on the subject. Some have marled over all their arable lands; very many are engaged in it, and many are commencing, and many others preparing to commence. All, or nearly all, profess to admit its value, but still there are few who give themselves to the work, as its importance would seem to warrant. Although deposits are almost daily being found, where none were thought to exist, still there are many farms and neighborhoods, in marl regions, where none have as yet been found, or if found, are unavailing to the owners, from their locality; but which farms are in a few miles, either by land or water, of inexhaustible deposits of the richest marls, the most valuable and only permanent manures (save lime) which can be applied to our acid, and without calcareous matter, comparatively sterile soils. Still these owners are prevented from using the only means which can enrich their lands, by an indefinite idea of the expenses attending the use of marl, where it is not to be procured on their own lands. It is with the view of aiding the latter class chiefly, if this should come under

the notice of any such, that I propose to make the following statement.

As I have already stated in my answers to your queries on the subject of marling, all the marl which I use, I bring 8 miles down the river. My boat is a decked, or what is called, a camel lighter. It is 48 feet long, by 12 wide, the sides 32 inches deep. When properly loaded, it carries about 600 bushels. Two hands man her very well, but they cannot make a full load in two days the time allotted for a load. This is easily done by 3 men the number usually carried, though 2 hands will bring down 400 bushels, in the above mentioned time.

The marl is wheeled in on barrows, some 10, 20 or 30 feet, as work is extended into the bank, and is discharged in the same way at the wharf or landing at home. At the above rate it would give 100 bushels of marl per day for each hand. Now estimating the value of each hand at \$150 a year, for hire, clothing and feeding, allowing 300 working days, would be 50 cents a day, or \$3 for the trip of 2 days. The boat only cost me \$70 out of pocket; but the ship carpenter, who built her, said he could not build one, furnishing materials himself; for less than \$300, so we will put it at that price; the interest on which, would be \$18 per annum; and supposing the lighter would last 10 years, the common life allotted to such boats, it would be necessary to create a sinking fund of \$30 a year, which would be an additional 10 per cent. on each \$100; so that at the expiration of the 10 years, you would be reimbursed in the original cost, to which may be added for the annual repairs of the boat, \$10, and wear and tear of implements used by the laborers, such as wheel-barrows, picks, grubbing hoes and shovels, \$5, a liberal allowance, making, viz: interest \$18 + sinking fund \$30 + repairs \$10 + implements \$5 = \$63 per annum, for boat expenses, &c. Now allowing the boat to run but 8 months in the year, would be but 208 working days, making 30½ cents per diem, or 61 cents a trip, which makes the actual cost of the marl at my landing (not paying any thing for the marl) \$3.61 cents. per boat load of 600 bushels, or rather over half a cent per bushel. The expense of hauling therefrom, will depend upon the distance to be hauled, on the fields, which each one can best estimate for himself, and it will therefore be unnecessary for me to do it in this place. When spread on the land, I should think it cheap to estimate the intrinsic value of the marl at 10 cents. per bushel; which, at the rate I apply it, of 200 to 250 bushels per acre, would make \$20 to \$25 per acre, and I think I may safely say the enhanced value of the land, would be considerably more than that amount, as soon as laid on.

Perhaps larger boats, such as are used on the canal at Richmond, which carry, I have been informed, 1200 bushels of coal, would answer better; that is, be of more easy navigation, and carrying so much more, would make it cheaper, particularly if to be transported any distance. Such is my opinion of the value of marl, after an experience of some 8 years in its use, that I should not hesitate to carry it one hundred miles, on navigable water, provided it was good, and I could procure neither that nor lime nearer. Should any think the estimates I have made too high, or too low, for labor, he can alter them to suit his views; but

I do not think they can be so varied as materially to change the general result of my calculations. The marl of which I have spoken is entirely of the eocene description, and is found on this river (the Pamunkey) in great quantities cropping out on the banks, from 10 to 25 feet perpendicular. How much below low-water mark it goes, has not been ascertained, as we have never gone through it. The analysis of this marl I have given as according to Professor Rogers in my answers to your queries, it is therefore unnecessary to repeat it here. You may perhaps think by this time, Mr. Editor, that having bestrided my hobby, I have forgotten when to dismount. Not so—but such is my desire to see our tide-water country attain to the value of which I think it capable of being brought by good husbandry, and a judicious use of the means which have been placed for our use by the bounteous hand of nature, that I am anxious to place all the little experience which has fallen in my way, before my brother tide-water farmers, who are situated as I am, that if they think proper, they may profit by it.

CORBIN BRAXTON.

November 5th, 1840.

CURRENT AND BLACKBERRY WINES.

To the Editor of the Farmers' Register.

Nov. 20th, 1840.

At our late agricultural show, on the 13th and 14th of this month, at Fredericksburg, there were exhibited two samples of wine—the one of blackberries, the other of currants—both of which were so highly approved, that your readers, I think, will be pleased to have the receipts for making them. I therefore now send them to you for publication.

To make currant wine.

Gather the currants when ripe; mash them with your hands; to each gallon of mashed berries add one gallon of water; strain through a hair sifter; mix two pounds of brown sugar with every gallon of the strained liquor; and immediately bung the whole quantity in a clean cask, where it should remain twelve months before it is broached.

To make blackberry wine.

Pick the berries when ripe, squeeze out the juice by hand, and to every gallon of it add one quart of water and three and a half pounds of brown sugar. Mix the whole well together, and then bung it up in a clean cask or barrel, where it should remain twelve months before it is bottled.

The blackberry wine was preferred by most persons who tasted the two kinds; and one gentleman, who had frequently drunk the Scuppernong of the best quality, gave the blackberry wine the preference. Much credit is due to the lady who sent the sample of the currant wine, for she had made sixty gallons of it last summer twelve months, and a very pleasant drink it proved to be. The gentleman who sent the blackberry wine had made 16 gallons of this agreeable beverage, and has thereby demonstrated, that the

vines and bushes which yield it, and which we agriculturists have heretofore deemed great nuisances, may be turned to profitable account. Quere, Would it not be a good spec. to substitute them for our multicaulis trees, although I have lately heard that a very ingenious process had been discovered, by which the leaves of the latter may be converted into excellent soup. For the truth of this highly interesting development of multicaulis properties I am not prepared to vouch; as I have neither tasted the soup myself nor seen any person who had done so. But another summer shall not pass over my head, (should I live to see one,) without a thorough investigation of this important discovery.

JAMES M. GARNETT.

PROCEEDINGS OF THE MASON, CABELL AND KANAWHA AGRICULTURAL SOCIETY, IN REGARD TO THE ESTABLISHMENT OF A STATE BOARD OF AGRICULTURE.

For the Farmers' Register.

At a meeting of the Mason, Cabell and Kanawha Agricultural Society, held at the town of Point Pleasant, in the county of Mason, on Thursday the 5th day of November, 1840,

The following preamble and resolutions were offered by George H. Patrick, esq., and unanimously adopted.

Agriculture, in its various relations, combines the most important interests of all civilized nations. The embellishment of civilization, the enlargement of commerce, the extension of arts, the development of mineral wealth, and the growth of manufactures, are all in a greater or less degree dependent on the well directed and successful application of the capital, skill and industry bestowed on agriculture and its kindred pursuits.

It is the source of all permanent national wealth, strength and prosperity; sustains by its contributions, direct and indirect, nearly all the burthens of government and of society; yet, up to this period, in the legislature of Virginia, no effective measures have been adopted to impart new vigor to this leading interest of the state.

In Europe, as well as in most of the states of the American confederacy, agricultural boards have been established, schools of instruction endowed, and agricultural societies patronized with the happiest effects and most beneficial results. We cannot admit for a moment that the general assembly of Virginia is not fully apprised of the just claims of the great body of her agriculturists to every fostering measure which a wise system of laws and appropriations may administer to the enlargement of their pursuits and profits, by increased developments in tillage and culture, and new stimulants to improvement; but believe, while every patriotic feeling of that respected body has been in union with the advances of the age, they have awaited the expression of the public sentiment in favor of an efficient effort to collect and diffuse agricultural information and improvements in husbandry throughout the commonwealth. Seriously impressed with the importance of the subject, and with full confidence in the wisdom and patriotism of the legislature, this society comes to the following resolutions:

1st, That Gen. P. H. Steenbergen, John Lewis and the Hon. Lewis Summers, be appointed a committee for and on behalf of the society, to prepare and present a memorial to the next general assembly, praying the establishment of an agricultural board, with such suitable powers and duties, as to the wisdom of the legislature may seem proper.

2d, That adequate aid and encouragement may be given to all societies formed for the advancement of agriculture in proportion to some just standard to be fixed by law. And,

3d, That the foregoing preamble and resolutions be published in the Farmers' Register; and our agricultural brethren throughout the commonwealth invited to co-operate with us.

A. W. QUARRIER, Sec'y.

TO SMALL FARMERS.

For the Farmers' Register.

I frequently hear small farmers say, "Ah! it is well enough for Mr. So-and-so to read the 'Register,' and try experiments; but it will not do for me." Neighbor, if this is your case, let me tell you that I am a small farmer, and I can testify that the reading of agricultural works has been of great advantage to me, and I am sure will be to you, if you will read them. Perhaps you will say that the correspondents of the 'Register' propose plans of improvement on too large a scale for you. This may be, generally speaking; but then, when we read, we must reflect how far *this* or *that* can be applied with advantage on our own little farms. And again, I know many small farmers who are fully competent to write for the 'Register,' and by not doing so they neglect to discharge a duty which they owe their brother farmers. The hand which is now using this pen, a few minutes ago was using the hoe—and to much better effect too—but, you see, Mr. Ruffin has not rejected this piece because my ideas are not couched in elegant or purely grammatical language.

But to the point. Small farmers should attend to small matters, and some big ones too; and the first of these is the improvement of their minds. The reading of agricultural works, as well as all other good books, has a powerful tendency to effect this desirable object. Next, the improvement of our morals. Let us have our consciences "void of offence towards God and man," that we may enjoy fully the bounties of Providence. Then the improvement of our little farms, which we should not only do as a matter of necessity, but as a duty which we owe to our God and to our posterity. This is to be done in a variety of ways. We should be as careful to store up food for our crops as we are for our families. No ashes, slops, bones, sweepings of the yard or kitchen, or litter of any kind should be lost, that can be converted into manure, and cultivate no land without its being manured well. Let a fruit tree be planted on every little unoccupied spot of ground near the homestead. Concentrate your labors on a small spot. Keep no more stock than you can keep well. Dispense with your useless dogs, and such like. Subscribe to the 'Farmers' Register' (or some other agricultural paper) and you will soon have cause (as I now have) to be thankful to the

editor and his correspondents for the great benefit they have done you. Your farm will afford more profit and more pleasure; it will inspire a feeling of manly independence and gratitude to a kind Providence; you will be a fitter subject for a republican government; in short, you will attain the enviable title of

A RICH POOR MAN.

KIDNEY-WORM IN SWINE.

From the Southern Cultivator.

We have taken some pains to make an examination in a case of this disease, which has resulted in exhibiting facts, important in fixing its character and which should be extensively known to farmers. We had met with various prescriptions for curing the disease, (which is known by the animal *breaking down in the loins*.) among which were the internal administration of arsenic, calomel, &c., and the application of spirits of turpentine to the back and loins—all of which proved abortive on trial.

This summer we had a fine barrow, in good thriving condition, suddenly taken down with this affection. There was a general paralysis throughout his whole frame, even his jaws being so much affected that he could with difficulty bite corn from the cob; but in his hinder extremities all strength was gone. We tried the above prescriptions, but without any visible effect. Determining patiently to await the result, we suffered him to linger out a miserable existence till within a few days ago, when he became so low and exhausted that we had him knocked on the head to terminate his sufferings.

On taking out and examining his kidneys, we found them perfectly sound, free from worms, or all trace of worms of any kind! We then extended our examination to the region about the kidneys, and found every thing in an apparently healthful condition, till we reached the spine bone—when, as indeed we had suspected, we found the seat of the disease.

Immediately over the kidney, we discovered a perforation in the spine bone, which ranged from the direction of the right flank to the top of the left shoulder, passing through and through the bone and marrow, large enough to admit the passage of a musket ball, and looking as if it had been bored by a worm as large as the common white grub. But to our surprise, we found no worm, nor any perforation in the adjacent parts indicating its escape. We have since conjectured that the worm was so much smaller than we had expected to find, on discovering the hole in the bone that we over-looked it, though present.—There was no indication of general decay in the bone—but all was apparently sound, with the exception of the round perforation above mentioned.

The investigation has satisfied us, that if the *kidney-worm* (so called) does exist, it does not perforate the kidneys—that the *spine* is the part affected—that the prescriptions above alluded to, and all similar prescriptions, are too impotent to give relief, and that, in truth, when a hog breaks down in the loins from this cause, there is but one sensible course to be taken, and that is to knock it on the head before it eats more corn.

We had before known that the spinal marrow is the seat of all nervous action—that all the nerves of the system distribute themselves on, and receive their vitality from it, and that whenever or from whatever cause, the spine is seriously injured, all nervous action below the point of injury is paralyzed. Hence, when we reflected upon what was the probable cause of the loss of strength in the hinder extremities of the hog, we suspected that an investigation would show it to be some direct or indirect injury to the spine. And the result has verified the suspicion.

We make known these facts, to save our farming friends all unnecessary trouble and expense in keeping and feeding hogs thus affected. It is better to terminate their existence at once; for all cure is out of the question.

SOWING GRASS SEED IN WOODLAND.

From the Southern Cultivator.

Near Colbyville, Ky., Oct. 14, 1840.

The woods should be prepared by burning the leaves, cutting up the logs and brush, and burning them, and thinning the woods so as to allow the sun's rays to shine upon every part of the ground some time in the day. It is usual to kill, or cut out all the sugar tree, elm, box-elder, iron wood, and every thing else that will not make rails or saw logs. When the ground is ready, it is a matter of much importance to sow upon it such seed as is suitable to the soil. If there is lime in the soil and not much sand, blue-grass* will be suitable for it. If there should be much sand in the soil, then some grass with stronger roots than blue-grass would be necessary to prevent its being pulled up. Orchard grass and the clovers would be better in such cases. Blue-grass generally succeeds well upon land that has some or all of the following trees—ash, sugar tree, white and black walnut, locust, wild cherry, box elder, buckeye, elm, mulberry and hackberry. Where oak and hickory predominate, orchard grass generally succeeds well.

Where there is lime-stone, there is a strong presumption there is lime in the soil, though it is not invariably the case. To ascertain certainly whether there be lime, take one part of muriatic acid, and two of water, and pour the mixture upon a portion of the soil in a glass tumbler, and the quantity of bubbles will be in proportion to the lime. If the earth has been weighed, the fluid poured off, and potash be added, the lime will fall to the bottom, and dried and weighed, the proportion can be ascertained. After it has been determined what seed to sow, it is important to have them of a good quality. Blue-grass seed is often injured by heating after they are gathered. They are bought by our merchants in large quantities, and are put in bulk, and not being quite dry they sometimes heat and destroy their vitality. When this is the case, it can be known by the smell, which shows that a rotting process has commenced. Good seed should smell like well cured hay. Clover seed will come up at almost any age, yet clover seed more than a year old is not worth half as much as fresh seed; for although it will come

up, it will not all come together, but at different periods, so as to make the crop very uneven. Fresh clover seed may be known by their brightness, each seed appearing as if it had been glazed.

Blue-grass and timothy may be sown at any time from September to April. A snow is usually chosen to sow, because the seeds may then be distributed more evenly without the trouble of marking off the ground. And I have generally sown blue-grass first, and then crossed the ground in a different direction with timothy. The blue-grass seed will be distributed more evenly by being well rubbed so as to separate the seed, which are stripped in bunches.

After the seeds are sown, all the cattle on the farm should be put into the woods where you have sown them, and fed there with hay or stock-fodder or whatever they are fed with; and kept there until the seeds begin to sprout, when every thing should be taken off, and nothing allowed to go upon it again until the grass has seeded, when it may be heavily stocked. The object of putting the cattle upon the ground after sowing the seed is that they may tread it into the ground. If sowed late, the grass will not seed the first year, and the temptation will be very great to turn stock upon it, and some of our best farmers recommend it. My experience is against turning on any stock until it has seeded.

My land suiting both timothy and blue-grass, I have generally sown both upon it, in the proportion of a bushel of each, in the chaff, to the acre. In a few years the blue-grass takes entire possession of the ground, expelling all the timothy. The advantage of sowing timothy with the blue-grass is, that the timothy is a quick growth and takes possession of the ground and affords considerable pasture before the blue-grass comes on, keeping out weeds, and yielding to the blue-grass as it gets stronger. The blue-grass is very weak the first year, but becomes a strong hardy grass afterwards. Blue-grass is not killed in the winter, and affords much food at a time of the year when green food is particularly valuable. As blue-grass is tender the first year so it is also early in the spring; and if grazed close in April and May, it will afford very little grazing the balance of the season: but if permitted to get a good start in the spring, it will afford an abundant supply during the whole season. A few years ago, I sold some beef cattle in October, off a piece of woodland pasture of seventy-six acres. The fall was favorable to the growth of grass—and in December I put upon it twenty horses and my flock of sheep, (upwards of one hundred,) and they were well wintered upon the grass with only two loads of hay during the winter. There were only two snows that winter that lay several days on the ground, and at each time a load of hay, supposed to be about half a ton, was hauled out to them. My sheep are wintered every winter in this way, and the wethers are sold in the spring as soon as sheared for the highest price that mutton commands.

Formerly, most of the trees a foot in diameter, and under, were cut down and cut up and burned; now, the trees that are not thought valuable for timber are all killed by chopping around them, and they are allowed to fall, or are cut down at some leisure time and burned. Trees may be killed at any time of the year, but the best time is in May, June, July and August.

SAMUEL D. MARTIN.

* Green-sward—*poa viridis*.—ED. F. R.

REPORT ON ARBORICULTURE.

From the Carolina Planter.

Your committee would respectfully submit that few objects excite the surprise of foreigners of intelligence more than the total neglect of fruit in the southern portion of the United States. This is neither complimentary to our good sense, industry, or fine taste.

In all European countries congenial to the culture of fruit, great attention has been bestowed on this branch of rural usefulness—not only by those who have abundant means for the perfection of the different varieties cultivated, both by the aid of science, and abilities, which would require solicitous care to be bestowed on these mute friends of the human family, but even the humble cottager, who subsists on the daily pittance which his labor yields to him, takes an honest and laudable pride in his small though well cultivated garden, whose bowers are composed of trees, the branches of which bend to man, their benefactor, and gratefully yield to him the choicest and most delicious fruits of his clime, which administer abundantly to the frugal wants of his homestead and family—affording delicacies that cheer his toils, and which in winter contribute to his enjoyments, and arouse his expectations, by reminding him that other seasons will soon roll round, when the dreary looking earth will again be robed in flowers, and bear again the beautiful gifts of God's blessings to his dependent children.

What credit is this reflection to the citizens of South Carolina, who have such abundant means, so much leisure, and such a congenial climate, all of which have been ill applied, if applied at all, or at least have settled into the apathy of indifference, on a subject, which, if properly considered, would not only be beneficial, but which would eventually become a source of the most elevated satisfaction.

In South Carolina, on some plantations, scarce a fruit tree is to be seen—and even if a few stunted subjects are occasionally observed in their general impoverished and wretched condition, seeming struggling to raise their puny heads above the mother earth which affords no congenial food for their numerous and greedy organs, we are convinced that they can afford no profit, and from their sickly appearance we derive no pleasure. This very feature, in what are here termed orchards, has caused many persons to conclude that fruit will not thrive in our happy clime: yet, it gives your committee great pleasure to be able to report, that fallacy in this, as well as in other matters, may be exposed and subdued, and that with proper culture many choice varieties of the principal and most substantial fruits which exist, viz: the apple, pear, cherry, peach, nectarine, plum, apricot and quince, may be cultivated with complete and brilliant success.

It is not alone for the mere gratification of the animal appetite that we recommend their culture—they administer to the wants of the mind as well as to those of the body. We are endowed with other senses than that of taste—faculties which contribute to the exalted enjoyments of life. He who reads a page of pure morality from the trees loaded first with flowers, and admires in these flowers as they are scattered by the breezes of heaven, to be succeeded by the richer gifts of fruit, grateful to the eyes of the children of the

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earth, the wonderful handiwork of the Creator of the universe, possesses a source of satisfied happiness, which must ever be unknown to the mere worldling. Thus our daily walks may lead to a consideration of his goodness—also, of the created wonders of his vegetable kingdom, urging upon us the conviction that to assist nature and bring forth perfectibility in her operations by the means and intelligences with which he has endowed us, must ever be the most laudable and least reprehensible pursuit which can occupy the attention, and engage the energies of mankind.

To descend somewhat into detail, each person who wishes an orchard with trees of the "life-looking" kind, should procure, as a commencement, a few varieties of the most choice fruit, which can be done at an expense and trouble, trifling, when the return which they will yield is considered. In a few years they will begin to reward him for the care he may bestow on them, and this return will increase in proportion to the application and free bestowal of that care. Having in this manner obtained a start, their numbers can be multiplied by various processes, which we shall describe under their respective heads—and in connexion with this operation the rising family may be instructed in these various manifestations, which may be of as much importance to them at a future period, as any other branch of knowledge may be should their wants require it.

Additions and exchanges may be made with ease, that ere a man, who has never bestowed attention on an orchard, could imagine an assortment completed, he would be startled to find that the energetic orchardist had already under his care, trees which had drawn their natal nourishment from every fruit-yielding country of the world. From a limited acquaintance with fruits, both native and foreign, during a few past years, your committee ventures to assert that to more than nine-tenths of our citizens are the most choice varieties of fruit unknown even by name, and but few of the best fruits have been cultivated any where in our state.

The chairman of your committee has procured, and has growing with promising success, nearly every celebrated variety of fruit both foreign and native—many from England, France, Germany, and Holland, which are there held in high repute—but the experiment has yet to be made, whether they will suit our climate, yet from present appearances he is sanguine of complete success, and when they fruit this society shall be informed of the result of the experiment.

Such foreign fruits as have already proved themselves to be adapted to our climate, and those native varieties which are worthy of propagation and culture, will be given in a list under their respective heads.

Within the last twenty years great attention has been bestowed on this department of horticulture throughout Europe, during which time many new and valuable varieties of fruit have been produced by the aid of science and skill, and thus variety after variety has been acquired—in some a preponderance of size having been obtained, whilst in others flavor has been transferred from some choice kind, and by these means the requisites of fine flavored and large sized fruit has been the desired effect.

To Prof. Van Mons, of Belgium, are we indebted

ed for many experiments on the pear and apple, and for many new and valuable varieties of these fruits. By impregnating the flowers of one kind with the pollen or farina of another, and planting the seed thus matured, a new variety is invariably produced—sometimes partaking of the qualities of both, yet, often superior to each, which shows the necessity of grafting and budding, when a particular variety is to be increased, as all are liable to mix whilst in bloom, the wind wafting the farina gently from flower to flower. It is owing to this promiscuous intermingling of different kinds of trees that we see so many varieties of fruit; occasionally a superior variety is produced from seed, and again a favorite lost.

In order to facilitate a thorough knowledge of propagating, and introduction of good fruits among us, we will give brief directions for the most popular modes of propagation, and a list of the most approved varieties of fruit.

Budding.—This mode has several advantages over grafting: it is more readily performed, with fewer implements, less preparation, and with greater success, it does not injure the stalk if unsuccessful, as is the case in grafting, and the operation may be repeated several times during the season, as its performance is protracted for some one or other of the varieties, for three or four months. June, July and August is the proper season for budding the apple and pear. The cherry should be budded early in June, while the plants are in thrifty growth. The plum should also be budded in June. And the peach and nectarine may be done as late as September.

The first consideration is to provide stocks, if this provision has not been made. Seeds may be collected with ease—those of stone fruit may be deposited in a hole in the garden, and buried superficially in autumn, to expose them to the expanding influence of the frost. Early in the spring plant in drills which have been well prepared, and made rich with good soil, or decomposed manure in order to shove the young plants with vigor. If they have been well treated, the peach can be budded in September following, and they usually succeed best if worked on young stocks of the first year's growth.

A bud is an organized plant in embryo, with roots, branches and foliage, and, like a seed, capable of the reproduction of its species. The process of budding is the transferring this embryo plant from the parent tree to another tree of the same genus, if not of the same species. To render this successful, it is necessary, 1st, that the bud be in a proper condition to transfer. 2d, that the stock be in a condition to receive and nourish it. And lastly, that the transfer be skillfully made. The principal precaution should be to choose young, healthy wood, full of sap, the bud should be matured and peel freely, as this is necessary for the insertion of the bud, and indicates the presence of the cambium, which is the soft partially formed wood under the bark, and is the source of nourishment to the bud, and the bond of union between it and the stock.

There are many modes of inserting buds, but we shall confine ourselves to the most successful method—Shield or T budding is thus performed—select a smooth part of the stock, rather from than toward the sun, make a horizontal cut across the rind into the wood, from the middle of this

transverse cut, make a slit downward an inch or more in length—the thin end of the haft of the budding knife, or if you have not a budding knife convenient, the thumb nail will answer as a substitute, is then to be applied to the top of the incision, which is done by gently raising the top, and running the end of the haft downward on each side to the end of the incision. The incision being made for the reception of the bud, the next thing is to prepare the bud by placing the scion in the left hand, the knife must then be inserted more than half an inch above the eye, and drawn through half an inch below the bud, cutting it out with nearly half the wood, cut the bark off square, half an inch above the eye, before taking out the wood, to fit the transverse cut in the stock; this done the wood is to be carefully taken out, and it is then to be inserted neatly into the incision, by pressing it gently down between the bark and wood on the tree until the bud fits neatly with the transverse cut in the stock. Bind it carefully with a strip of cloth $\frac{3}{4}$ of an inch in width, beginning first at the bottom of the incision and then continuing it to the top, over and above where the cut is made, taking care not to let the bandage cover the eye. Cut off the top of the stock to within 5 or 6 inches of the bud. In ten days after budding, such as have adhered may be known by their fresh appearance at the eye, and in three or four weeks, all those which have succeeded will be firmly united with the stock, and as the buds are now beginning to swell, the ligatures should be taken off. The shield and bud now swell in common with the other parts of the stock; nothing more is required than to keep the stock free from shoots, so that the bud may receive the full force of the sap, and before the rising of the sap in the spring they should be headed down close to the bud by an oblique cut terminating an eighth of an inch above the shield.

Grafting.—March is the general season for grafting, in this latitude, though it is occasionally performed earlier or later. The scions for grafting should be cut before the buds begin to swell. The grafts are most likely to live and thrive if inserted when the sap circulates freely, for then the wounds soonest heal.

The materials and implements necessary for grafting are

1st. A sharp knife to cut and pare the grafts and stock:

2d. A strong knife and small mallet, to split the larger stalks, and a small iron, or hard wood wedge to insert in the cleft while the scion is fitted to its place:

3d. Strips of cloth on which have been spread some grafting wax, to bind the stock and graft. A grafting wax which we have used with great success is made by mixing and melting together four parts of rosin, two parts of tallow, and one of bees wax; this may be applied over the grafted part in a thin layer, or in case of small stocks, on strips of cloth, as recommended above, and bound around the wound. The wax is applied—

1st. To prevent the waste of sap from the wound.

2d. The too sudden drying of the wood, and

3d. Exclusion of rain water from the cleft.

Success in a measure depends on the exclusion of air and water. The object to be arrived at in the process of grafting is to bring the inner bark and the sap wood of the stalk and scion in nice

contact ; so that the ascending sap of the stalk will pass freely into the sap wood of the scion, and the descending sap of the scion, which has been elaborated, and prepared in the leaves, and which descends through the inner bark, to pass freely into the inner bark of the stock ; this elaborated sap soon harden into wood, and covers and heals the wound.

There are a great many modes of grafting practised by professional nurserymen, but we will confine ourselves to one or two best adapted to the practice of the nursery and orchard.

Cleft grafting—is most readily performed and mostly practised. Cut off the stalk horizontally, make the cleft through the centre, in this insert the wedge, the scion is then formed in the shape of a wedge, taking precaution to make the inner side somewhat thinner than the outside, so that the bark of the stock will press on the outer bark of the scion : shoulder it neatly, and insert carefully ; the shoulder is made to retain the graft in its proper place, and the better to enable a union to take place ; for it will really be perceived that it has the additional chance of uniting on the face of the stalk. This process can be used in heading large trees in the orchard, as well as on small stocks in the nursery.

Whip grafting is generally performed on small nursery stocks, and is universally practised in the nurseries of Great Britain, France and Germany. It is performed by cutting off the stock at the place selected, in a neat sloping manner, then with a sharp budding knife from the smooth part, next to the lowest part of the cut, shave off the bark and wood two inches in length, beginning at the bottom by drawing the heel of the knife gently in the bark and gradually cutting deeper into the wood until the blade is drawn out at the top. The graft is prepared by cutting it in a sloping manner in a reverse position, so that when placed on the cut of the stalk it forms a neat splice. When the graft is set, it is to be bound securely with a stripe of cloth on which has been spread some grafting wax. The French and German mode differs from the English in their never paring off more of the stocks, however large, than the width of the scion requires.

Grafting under the surface of the ground is very convenient to grow young trees in the nursery ; the stocks are cut off a few inches below the surface and the scions inserted. It is particularly adapted to the plum, cherry and apricot ; they can all be easily propagated in this way.

Planting.—The planting of fruit trees being for utility, every precaution should be used to forward the intended purpose by the best means. Care should be taken to give them a vigorous growth when young, in order to form a strong healthy subject at a future period. It being our object to cultivate the most approved kinds, it should be borne in mind that they have attained their high reputation in most instances from the greatest care and the best culture. The cherry and apple, when planted too deep, lose their original roots, and are forced to throw out new roots from the stem near the earth's surface. The pear strikes root deeper for its support, and is most thrifty and productive in good soil with moist clayey subsoil, and if in a situation not too much exposed will generally produce good crops of fruit. The plum requires rich and rather moist soil to

insure good crops of large fruit ; it is however very productive if planted with care in yards and along lanes. The apricot requires a location similar to the plum, and will thrive wherever the plum can be cultivated with success. The plum and apricots being thin skinned fruits are more subject to the attacks of the curculio than others ; to prevent which, plant in yards and along lanes where the ground is rich and trampled, and where pigs and poultry can have free access in picking up the waste fruit. Where this cannot conveniently be done, they should be well shaken once or twice during the week, and cast to the hogs. The best location for the quince is a rich loam where it is continually moist, hence it is that it usually flourishes well by the sides of drains. A good loamy subsoil is of the greatest importance to the full development of its fruit.

If possible, particular care should be taken in selecting a suitable situation for the orchard, a good level piece of land, if it be so located as to lie a little descending to the southeast is to be preferred, as in that situation it will receive the warming influence of the sun in the spring, so congenial to the growth and maturing of the fruit. The quality of the soil is the next important consideration ; a rich mellow loam, with a clayey subsoil, will be found to answer most kinds of fruit. When obliged to plant trees on a sandy or gravelly soil, we would advise the experiment to be made, of incorporating ditch or pond mud, with a small portion of lime or leached ashes, or clay in less quantity with a suitable portion of compost manure spread on to the depth of several inches, would be sufficient when apple and pear trees are to be cultivated. When cherry or plum trees are to be grown, it is advised to cast on a sufficient quantity of rich loam, &c. For plums, when it is practicable, perhaps a third part of marsh or pond mud may be used with advantage to make the soil of the proper depth. Where peach trees only are to be planted, a light dressing of compost, consisting of stable manure, ashes, and loam, will answer the intended purpose.

An error which has been practised here to some extent, is that of planting too far apart, thereby exposing the trees to the scorching rays of the summer sun, the fruit will always receive sufficient warmth for ripening, if pruned regularly. From 16 to 18 feet is the best distance that can be adopted in this latitude, they will be more durable and thrifty, and when fully grown will shade the ground, and thus protect the trunk.

January and February are the proper months in this climate for transplanting fruit trees ; the holes should be made from 3 to 4 feet in diameter and 2 feet in depth. If the land is somewhat exhausted fill up with good rich loam, or mould from the woods, a foot or more in depth—then place the tree in the centre of the hole, taking care to spread the roots well, and not to place it more than two inches deeper than it stood in the nursery—fill in the finest and best mould on the roots—the assistant gently shaking the tree to enable the fine mould to run in among the roots and fibres. As the earth rises about the tree, gently tread in until all is level. Fix in a good stake, and tie it fast to the tree at the top, crossing the bandage between the tree and stake, to prevent the bark from being rubbed. It is advisable to have some straw put around the trees the first season, to prevent eva-

puration, this will be of inestimable service in the event of drought. The ground about the trees should be kept clear of grass and weeds, and no crops should be grown near the trees, as they deprive them of the warming influence of the sun, and the surface nutriment. The orchard grounds should be made rich, and should be kept so, after the trees arrive at a bearing state.

The following remarks, by Sayers, on the pruning and formation of fruit trees, are so well expressed, that we take great pleasure in giving them a place.

"To form a tree properly it will require to be pruned and regulated when young, in order to bring it into a proper shape and fruitfulness. Supposing the tree to be two or three years from the graft or bud, a head must be formed at the intended height by heading it down in the spring, to two or three buds or eyes in each shoot that is near the crown, when the young shoots begin to grow; they may be taken off to three or four in number of the healthiest, as they are intended to form the tree. During the summer, the young shoots may be cleaned of any insects that may be detrimental to them. In the following spring, the trees must be pruned in such a manner as to form a regular handsome head. It will be recollected that is the proper time to form a handsome tree, as each branch being formed from a common centre, draws sap in proportion to its luxuriance; and they afterwards form laterals or side shoots in proportion to their vigor; therefore it must be evident to every intelligent observer, that the formation of a tree in its infant state, is of the greatest importance. It will be often seen that one shoot is more luxuriant than another, which is owing to its being of a more succulent nature, and consequently draws a greater proportion of sap; by heading down those shoots to three or four eyes in the spring, the luxuriant will be divided into so many parts, and bring it on a balance with the other parts of the tree. This method may be continued for two or three years, when the habit of the tree may be seen. The *port* or *habit* of fruit trees should be considered, as the laws of nature are not easily reversed to any advantage, consequently they should be as much as possible cherished; for by practical observation, (which is always the best guide to perfection) it will be seen that some grow in a pyramidal form, some conical, and others form a regular head of an even circumference at the bottom, and tapering on the top in the form of a *dome*. The first of these habits, the pyramid, is beautifully exemplified in some varieties of the cherry. The second, forming the shape of the dome, is generally represented in most kinds of apple trees—and the conical is often beautifully represented in the cherry and many kinds of pears when young.

"In the art of pruning, the first thing to be attended to, is the port or habit of the tree, which should in all cases be kept in its natural order, by pruning in such a manner, as to encourage the most healthy parts of the tree. The next thing to be attended to, is in procuring proper tools for the purpose, which should be of the best quality."

Your committee would further add, that the advantages of summer pruning should not be overlooked, as there is then a brisk circulation of sap, the wounds are speedily healed, and protected by the foliage from the effects of the sun. In pruning it should be recollected that all shoots

which are amputated from the tree while young, heal better than when old, and that the shoots should be so taken as to leave the wound on the tree in a sloping manner downwards, to let off the water freely. The experiment of summer pruning need only be made on a few trees, and the old practice of winter pruning will be abandoned.

In recommending varieties of fruits for cultivation, we shall name such as have proved good, and which ripen at different times, and in the order in which they ripen. A list of all the good fruit collected by the Chairman of your committee would swell this article to a tedious and useless length.

Apples.—Sinclair's yellow June, early harvest, *sine qua non*, summer Pearmain, summer pippin, Miller's aromatic, a native seedling variety, summer seedling, from seed, by the chairman of the committee, King's apple, produced by Mr. King of Spartanburg, fall pippin, English red streak, bullock pippin, bell flower, Cumberland spice, seek no further, Esopus Spitzenburg, Newtown pippin, Hun's fine green, French green, carthorse, Columbia russeting, wine sap.

The following apples are of the latest introduction, among which are the new varieties that have been particularly noticed by the London Horticultural Society: also, the choicest new German varieties; described in the works of their most celebrated writers.

Ornabrucker's gros, rennette, saffron, Gravenstein, Emperor Alexander from Russia, spring grove codling, and black coal, from London, golden Harvey, court apple, or mile Carle, Revalesher red Reinette, Niemans rothe, zimmetariger, muntieski.

Pears.—Ripening in July and August. Early Catherine, green Chisel, Bartlet, large Portugal. Autumn pears, ripening in September. Seckel, Doyenne Virgalien or St. Michael's, musk spice, Holland table pear, swan's egg, belle et bonne, Buffum's St. Ghislain, Moore's pound.

Late autumn pears, ripening in October. Autumn bergamot, beurre bofe, beurre diel, Flemish beauty, health cot, Bleeker's meadow. Winter pears beginning to ripen in October and November. Burgomeester, Hungarian, English queen of pears, present royal des Naples, Cattilac Moore's Merrimack, Passe Colmar, Colmar Sovereign, Easter beurre, Rose lench—Napoleon—Echaserie.

Plums.—General Hand, Huling's superb—Yellow egg—red egg—blue egg—green gage, blue gage—prince's—imperial white gage, Bolmer or Washington, damased Mageron, Quesche or German prune, White prune, Corse's largest purple, Duane's purple, French, Reine Cloude—Bingham.

Cherries.—May duke—early Kentisk—carnation white and red Bigareau—yellow Spanish Napoleon Bigareau, black eagle—Waterloo, Elton—Cumberland seedling—Saml. Cline's cherry. Furne's large red—Black mazard, elk horn.

Apricots.—Large peach, monstrous peach, orange Roman cling, Roman free carpentras, Dark musk, apricot of Noor and peach leaved purple, common plum.

Nectarines.—Scarlet, Petersburg, aromatic Var-mish, Elruge.

Peaches.—We shall not attempt to give a list of this delicious fruit, as there are several esteemed varieties amongst us: the early varieties and the

heath Peach should be included in every collection.

Quince.—Portugal quince of superior flavor, large orange, large French and musk.

By selecting from each variety you will be enabled to make an excellent collection, which will give a succession of the most grateful, and at the same time healthful delicacies and luxuries of the table—and at the same time has a powerful influence in attracting men to their homes—and on this account every encouragement given to increase a taste of the kind, is additional security for domestic comfort and happiness.

WM. SUMMER, *Chairman.*

MONTHLY COMMERCIAL REPORT.

For the Farmers' Register.

The apprehensions which prevailed, of war in Europe, are almost entirely dissipated by the recent intelligence from thence, and commercial operations will no longer be affected by fears of that event. But while the news is pacific, it is at the same time by no means favorable to the mercantile (and consequently to the agricultural) interest. The heavy drain of specie from England to the continent had induced the bank to adopt, as it is termed, "very stringent measures," and the scarcity of money was severely felt. Interest had been paid in London, on the very best securities, at the unusually high rates of 7 to 8 per cent. per annum. And while this state of things continues commerce must languish.

Although the consumption of cotton is on a larger scale than at any previous time, and although the reports of a diminished crop in this country had reached Europe, yet the price continued very low, and little encouragement is held out to expect any material advance at an early day. The immense import from the United States during the last season, and the accumulation of both the raw material and of manufactured goods, tends, with the scarcity of money, to produce this effect.

The duty on flour had advanced in England to 14 shillings per barrel, and the price was 33s. duty paid—price in bond 23s. The export from this country has consequently ceased.

Kentucky stemmed tobacco is supplanting Virginia to such an extent, that the latter is in a great measure unsaleable, but fine Virginia leaf still retains favor. On the continent prices of low qualities had declined.

New leaf tobacco sells at \$5.75 to \$7.25—lugs 3.75 to 5.25. Supplies as yet are moderate, except of loose, in which state a good deal is now brought to market.

Cotton commands 8 to 9½ cents—little at either extreme. The demand for our domestic goods has increased, and a large portion of the cotton crop of Virginia and North Carolina will be manufactured within those states.

The home supply of wheat is so inconsiderable that the article is now shipped from Baltimore to Richmond. The quotations at the former place are 80 to 98 cents—at the latter 100 to 110; and more for fine white. In Petersburg the mills are frequently idle for want of grain.

The price of flour is \$4½ to \$5, in all our exporting markets, except for city mills. Corn 45

cents. The price of pork is not yet established—no droves having yet arrived from the west. X.
November 27, 1840.

PETITION TO THE CONGRESS OF THE UNITED STATES, TO EQUALIZE THE RATE OF POSTAGE ON NEWSPAPERS AND OTHER PERIODICAL PUBLICATIONS.

To the Senate and House of Representatives of the United States:

The petition of the subscriber, the editor and proprietor of the Farmers' Register, respectfully sheweth:

That the rates of postage on periodical magazines and on newspapers, as established by law and by usage, are so unequal, and so much higher on the former class of publications, as to operate to their discouragement most injuriously, as well as unjustly.

That the postage charged on newspapers (and all other periodicals, which by misconstruction of law are permitted improperly to pass through the mail as newspapers,) is one cent per sheet for any distance within the state wherein published, or to any distance without the limits of the state, not exceeding 100 miles from the place of publication, and one and a half cents to all greater distances in other states; and on periodical pamphlets or magazines, the charge is one and a half cents for all distances not exceeding 100 miles, and two and a half cents, even though within the same state in which the publication issues, for all greater distances. These different modes of assessment forbid any precise or accurate comparison of the amounts; but on a general average there can be no question but that the postage charged on periodical magazines, per sheet, is at least double of that on newspapers; and if estimated according to the respective weights or sizes of sheets, the postage paid on the former is six-fold greater than that on newspapers of large (yet not the largest) size now published.

That, on the Farmers' Register, an agricultural magazine established and conducted by your petitioner, the postage paid, on a general average, is more than \$1000 for each 1000 copies of the annual publication; while large newspapers, if distributed to like distances, are charged, in proportion to weight, but one-sixth as much as the Farmers' Register. Consequently, five-sixths of the tax upon the latter is so much in excess, and that excess operates as so much discouragement to the publication, and to the same extent causes a lessening of useful effects of the work, and obstructs its object, the improvement and benefit of agriculture.

That another discriminating burthen on magazines, and bounty to newspapers, is presented in the legal privilege of all copies of newspapers exchanged between publishers being exempt from postage, while that privilege is withheld from periodical magazines. The amount of weight of untaxed papers thus added to the mail transportation, by the free use of this privilege, cannot be estimated; but it is certain that the addition thus made forms a very considerable proportion of the whole amount of mail freight, and of the expenses of the post-office department, and also increases the unjust burthen on the publications to which the

bounty is denied, and which nevertheless pay otherwise the heaviest charges of the general expense of the post-office department, so far as defrayed by the transportation of printed papers.

That one effect of the unjust and impolitic discrimination between magazines and newspapers, serving, as it does, as a prohibitory tax on the former class, and a protecting duty for the latter, has been to cause sundry monthly and other periodical magazines to assume so much of the outward form of newspapers, (though still altogether different in law and in fact,) as to pass for, and to be charged as newspapers, by the misconstruction or favor of the post-office department. Thus, every publisher of a monthly magazine who can obtain this favor, thereby secures for his publication an indirect bounty from government, equal in amount to the great existing difference of the rates of postage.

That the inducement to obtain the benefit of this bounty is so great, that, if the present law and its construction remain unaltered, every agricultural, scientific and literary periodical, which has not already been degraded in its mechanical execution and form of publication, by assuming the disguise of a newspaper to secure this bounty, will be compelled to make the change of form necessary for that purpose; and thus, by a great sacrifice of good appearance and of real value in such publications, and to the lessening of their permanent utility, the post-office department will lose even the poor gain now derived from the discriminating and unjust burthen imposed on periodical magazines in pamphlet form.

That your petitioner, neither for himself, nor for the great agricultural class to which he belongs, and which his publication aims to serve, asks for any bounty or exclusive benefit; but merely that such publications as his shall be placed on equal ground as to postage charges with others now more favored; and he respectfully submits to the consideration of your honorable body, whether, as a matter of governmental policy, it is proper that every newspaper, of whatever character or object, should be aided in its establishment and subsequent support by the bounty of receiving free exchange papers, and the more extended protection of lower postage on all their issues, while other periodicals, designed to instruct and to improve, whether in agriculture, in the arts, or in literature and science, shall be subjected to a tax operating either as greatly discouraging, or altogether prohibitory.

Therefore, for the reasons set forth, your petitioner prays for such modification of the post-office law, as shall, on all periodical publications, whether newspapers or magazines, make the charges of postage equal, according to their weights, or to the extent of surface of sheets conveyed by mail.

All which is respectfully submitted.

EDMUND RUFFIN,
Editor and Proprietor of the Farmers' Register,
Petersburg, Va.

[The foregoing petition was sent on last winter to be presented to both houses of congress; but the members of those bodies, and friends of the petition, to whom the presentation was entrusted, thought it best to defer it, as no such matter could possibly be acted on, or even heard, during the last session. Perhaps the shortness of the ap-

proaching session may operate to prevent a hearing as much as did the *business* of the last long session. At any rate, the petition will be presented; and, so far, the humble efforts of the petitioner used to induce the removal of the enormous injustice and bad policy which exists, and which presses so injuriously upon every periodical publication, other than newspapers, and those which, to evade the discriminating tax, assume something like the form of newspapers, and are favored in that evasion by the partial and palpably erroneous construction of the post-office department.

All publishers of periodical pamphlets, on literature, science, or any of the useful arts, as well as on agriculture, are equally interested in the object of this petition; and it is probable that the *excess of tax* imposed on them by the existing unjust law, and incorrect and still more unjust usage, over and above what newspapers would pay in postage, amount to more than all the clear profit on these publications. And though this tax is levied upon, and paid by, the individual subscribers, it is not the less at the cost and to the injury of the publication, as its amount just so much increases the expense to subscribers, and discourages their purchasing such publications.

All subscribers to periodicals, also, as payers of this excess of postage, are interested individually in having it reduced to fair and equal rates; and still more the community at large, who, by the prohibitory operation of the tax, are debarred from a large portion of the benefits which might be otherwise obtained from the circulation of magazines.

The petitioner, therefore, hopes that he will not be permitted to act alone in this matter, but be strengthened by the concurrence and influence of the many publishers who are alike interested in the object, and by some of the many thousands of other persons who, as readers, and members of the community, have a still more important interest in the result.—ED. FAR. REG.

WORCESTER [MASS.] AGRICULTURAL SOCIETY.

From the New England Farmer.

Report on fat cattle and milch cows.

The committee having attended to the duties assigned them, beg leave to offer the following report:

The number of fat cattle offered for premiums were ten, viz:

By Gardner Wilson, of Leicester, one fat ox, weighing 2285 lbs., six years old.

By Luke Baker, of Rutland, two fat oxen, weighing, 2215 lbs., the other 2285 lbs., seven years old.

By Jedediah Estabrook, of Rutland, two fat oxen, weighing, one 2195 lbs., the other 2125 lbs., seven years old.

By L. & E. L. Barnard, of Worcester, three fat

oxen, one weighing 2580 lbs., one 2260 lbs., and one 1980; two of them eight years old, one seven years old.

By Silas Dudley, of Mendon, two fat oxen, one weighing 2350 lbs., the other 2100 lbs.

Also, one fat cow was offered for exhibition, by John Boyd, of Shrewsbury, weighing 1790 lbs. No premium is offered by the society for fat cows. The cow exhibited by Mr. Boyd was a very fine animal, and he is entitled to the thanks of the committee for his public spirit in offering so good an animal, without the prospect of pecuniary reward.

The committee were highly gratified with the exhibition of fat cattle, believing they will compare well with all previous exhibitions, and greatly surpass many. They have awarded the first premium of \$20, to Jedediah Estabrook, of Rutland, for his yellow ox.

The second premium, of \$15, to Luke Baker, of Rutland, for his yellow ox.

And the third premium of \$10 to Silas Dudley, of Mendon, an ox fattened under the care of Mr. Oliver B. Everett, well known in that section of the country for his skill and fidelity in this important branch of the farming interest.

The number of milch cows offered for premiums were seven, and one for exhibition only.

One by Matthew Connel, of Leicester, 6 years old.

" " Geo. Ainsworth, Worcester, 3 last spring.

" " Joseph Slayton, Brookfield, 7 years old.

" " W. Blanchard, Charlton, 7 years old.

" " T. B. Eaton, Worcester, 4 years old.

" " Daniel H. Fitch, Leicester.

" " James Leach, Southborough.

The cow offered for exhibition, was owned by J. P. Cushing, of Watertown, imported from England in 1836, of the Ayrshire breed, called the Venus, and deservedly so, as she was a beautiful specimen of that fine breed of cattle; and the committee and society are highly gratified at the interest taken in our shows, by distinguished agriculturists, in other sections of the state, and are particularly obligated to Mr. Cushing, who has made the society a splendid donation of a bull, of the Ayrshire breed.

The first premium of \$15, was awarded to Wm. Blanchard of Charlton, for the best milch cow. From the 17th to the 27th of June, she gave twenty quarts of milk per day, and made 17 lbs. during that period. From the 10th to the 20th of September she gave 15 quarts of milk per day, and made 11½ lbs. of butter. The cow calved on the 26th of April, and the calf was slaughtered the 9th of June,—the calf weighed 110 lbs.—the skin, 15½ lbs.

The second premium of \$10, was awarded to Thomas B. Eaton, of Worcester. From the 17th to the 27th June, she averaged 16 quarts of milk per day, weighing about 43 lbs. From the 10th to the 20th of September, 11 quarts of milk, Mr. Eaton states, "That since the middle of May, I have sold 1478 quarts of milk, and supplied my family, of from 8 to 10 in number, with milk and cream."

The third premium of \$8, was awarded to Dana H. Fitch, of Leicester. Mr. Fitch made in three weeks in June 33½ lbs. of butter from his cow, besides using 3 pints of new milk and some cream per day. In three weeks in September he made 21 lbs. 9 oz. of butter. From the second of June to the present time, he has made from this cow 143 lbs. of butter.

The other cows exhibited did not come in competition with those to whom premiums were awarded, as they had not complied with the requisitions of the society.

All of which is respectfully submitted,

C. C. P. HASTINGS, *Chairman.*

NATIONAL GALLERY OF MANUFACTURES AND AGRICULTURE.

From the Baltimore Sun.

Patent Office, Nov. 20, 1840.

Notice is given that the hall in the new patent office for the exhibition of manufactures, is now completed. The hall is spacious, being 273 feet long, 63 feet wide, 30 feet high, and fire-proof.

Agents whose names are annexed, will receive and forward, free of expense, articles which may be deposited with them. These articles will be classified and arranged for exhibition, and the name and address of the manufacturer (with the prices when desired) will be carefully affixed. Few, it is presumed, will neglect to improve the opportunity now presented of contributing their choicest specimens to the national gallery of American manufactures, where thousands who visit the seat of government will witness with pleasure the progress of the arts in these United States.

If fairs, in limited sections of our country, have excited interest, what must be the attractions of a national exhibition, enriched by daily additions.

The agriculturist may be gratified to learn, that commodious rooms are provided for the exhibition of agricultural implements, and also for the reception of seeds for exhibition or distribution.

The commissioner of patents, being authorized to collect agricultural statistics, avails himself of this opportunity to solicit information of the condition and character of the crops in the several sections of the country. These data will aid him in presenting, with his annual report, the aggregate amount of products of the soil, and it is hoped that the public may be guarded in some measure from the evils of monopoly, by showing how the scarcity in one portion of the land may be supplied from the surplus in another.

Names of agents who will receive and forward packages for the patent office. Collectors of the customs at Portsmouth, N. H., Portland, Me., Burlington, Vt., Providence, R. I., Philadelphia, Baltimore, Richmond, Charleston, Savannah, N. Orleans, Detroit, Buffalo, Cleveland. Surveyors of the customs—Hartford, Ct., St. Louis, Pittsburg, Cincinnati, Louisville; R. H. Eddy, Boston, Mass.; David Gardiner, (custom house) New York.

HENRY L. ELLSWORTH,
Commissioner of Patents.

Editors are very respectfully requested to give the above an insertion in their papers.

ALDERNEY COWS.

From the New England Farmer.

From a highly respected friend in Providence, we have received some inquiries respecting this breed of cows, and whether they are best suited

for beef or milk. We have seen several of them. They are small in size and generally inferior in shape and appearance, and seldom exhibit much thrill. They are not to be chosen for beef. They are not remarkable for giving great quantities of milk, but they are remarkable for giving milk of extraordinary richness; and persons in England and this country keep them for the sake of the rich cream for their tables. They are in general of a light red or a gray dun or fawn color, with small and crooked horns. Reuben Haines, of Germantown, Penn., in 1823, says—"I have now a little full bred Alderney cow, reared on my farm, which will be only four years old next harvest. She had her third calf on the first of last month; and on the nineteenth we had rather more than ten pounds of delicious butter from twelve quarts of her cream, obtained from fourteen milkings; that is, in one week. Her only food through the winter has been good hay and brewers' grains—the latter article well known to be useful in promoting the secretion of milk, but not increasing the quantity or improving the quality of the butter. One remarkable property of the cream of the Alderney cow is, the readiness with which it is converted into butter."

John Lawrence says, that "an Alderney cow

that had strayed on the premises of a friend of his, and remained there three weeks, made nineteen pounds of butter each week, and the fact was held so extraordinary, as to be thought worthy of a memorandum in the parish books." (Farmers' Series.)

They are originally from Normandy, in France; and are said, when dried off, to fatten with great ease. They are constantly imported into England, being admired for the properties to which we have above referred; but some disappointment has occasionally occurred, for the true reason that the pasturage in England is not so good as in their native land. Like all other animals from whom we are to look for any thing valuable, they require liberal feeding and the best care. We must not expect impossibilities. We remember very well a friend's having purchased a cow from a town abounding in the richest pasturage; and upon taking her to his own inferior pastures she fell very much short of the yield which he had been informed she had been accustomed to give. He complained to the seller of the cow that she had not fulfilled his recommendation. "Why," said the farmer, "I sold you the cow, but I did not sell you my pastures too."

H. C.

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DECEMBER 31, 1840.

No. 12.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ARATOR:

BEING

A SERIES OF AGRICULTURAL ESSAYS,

PRACTICAL AND POLITICAL.

BY JOHN TAYLOR,

OF CAROLINE COUNTY, VIRGINIA.

PREFACE TO THE SEVENTH EDITION.

BY THE EDITOR OF THE FARMERS' REGISTER.

The first publication of the following work was in the form of separate short essays, or numbers, which were written for and appeared in 'The Spirit of Seventy-six,' a newspaper then recently established. This was in 1809 or 1810, and the numbers were afterwards embodied and republished in a volume, in 1812. Five subsequent editions were afterwards called for, from the latest of which, the sixth, (published in 1818,) the edition now offered will be copied.

The publication, and the first few years of the existence of 'Arator,' constituted a memorable epoch in the condition of agriculture in Virginia. It was the first original agricultural work (worthy to be so called) which had ever been published in Virginia, or in the southern states; and it appeared at a time when agricultural improvement was still neglected by the men of intelligence and wealth whose interests were almost exclusively agricultural. The previous high prices of agricultural products, caused by the European wars, and increased foreign demand, which had given great profits even to the most wretched agricultural practice, had been sunk to less than half the gross amount, by the operation, first, of foreign depredations on our commerce, and, next, the singular defensive policy of this government, by the general embargo on all export trade, and prohibition of commercial intercourse with Europe.

This was a fortunate combination of circumstances for the appearance of 'Arator;' and the work produced an immediate sensation, and also durable and excellent effects, surpassing those of any publication which had ever appeared in Virginia on any subject. Almost every intelligent land-holder became a reader of Arator, and which book also constituted generally his earliest and sole agricultural study. The previous vacancy of all minds, in this respect, prevented the existence of any obstruction, from prepossession, to the author's precepts, or any doubt of the certain fulfilment of his glowing prospects of improvement and profit.

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The valuable truths were eagerly received, and soon extensively acted upon—and so highly esteemed was the authority of the writer, that even his most erroneous views and opinions were received as readily and universally as the most sound and unquestionable. Many readers even went far beyond the positions of their teacher, and applied his lessons in situations and under circumstances which he never would have embraced under his general rules. The particular errors of practice made by these new disciples were numerous, and the consequent losses were great. But the indirect effect of the publication was to give the first great impulse to agricultural improvement in eastern Virginia; and the general and legitimate results have been such as to claim justly for the name of John Taylor of Caroline, independent of his other great merits as a statesman and political teacher, a distinguished place on the list of the great benefactors of his country. The writer of these remarks is among those who esteem most highly the merits of John Taylor in both these important respects; nevertheless, his gratitude and veneration have not prevented him freely criticising, in former publications, the mistaken and erroneous views of the illustrious author, and his improper applications of views which are entirely correct under different circumstances. The great but indirect benefit which resulted from the publication of 'Arator' was the producing a new zeal for, and giving a strong and lasting impulse to, agricultural improvement in general. The other and peculiar merits of the author were most conspicuous in his urging the practices of deep ploughing, the making and applying of barn-yard or prepared manures, both of which practices were of very limited use in general—and still more the plan of manuring the fields by their own vegetable growth, or the "inclosing system," of which he was the earliest teacher and advocate.

The principal defects of this work, and the causes of injury to its earliest followers, grew out of precepts, which, even when correctly deduced from the author's experience in cultivation on the originally rich and deep sandy soils of the wide level borders of the Rappahannock, were improperly recommended by

him for general use, or without express limitation to particular circumstances. Though the author was a profound thinker as well as an experienced and judicious farmer, and though unusually well read in English agricultural works of earlier times, compared to most Virginians of his day, still he was without the benefit which has since been obtained by applying the lights of chemistry to the investigation of the nature of soils, and their improvement by mineral manures. He therefore was not only not informed of their great value, but he even speaks contemptuously in 'Arator' of marl and lime as manures.

But it is not only as an agriculturist that the author's merits deserve consideration, even in regard to the contents of this little book. Although not accorded to him during his life, and although even as yet the force and value of his novel and singular views are acknowledged by but a few, the just award of posterity will place Taylor high in the ranks of political reformers, though he had neither political power, nor the influence of popularity, to enforce his precepts. His later published and elaborate political work, the 'Inquiry into the Principles and Policy of the Government of the United States,' has had already more students and more influence than is acknowledged by those who use its materials for propositions which are generally deemed entirely novel; while the book, which is their source, is scarcely known to exist, and but few readers have been found zealous enough to labor through the obscure pages of the ponderous volume.

Though his 'Arator' was published first, it was written after the 'Inquiry,' and his long continued and solitary investigation of political truths. This will serve in part to explain the cause of the great obscurity of the early portion of 'Arator,' on the "Political state of agriculture." The author here addresses the public as if in continuation of the expression of his own prior political researches, which then in fact existed only in his own manuscripts, and the subjects had not been studied by any one but himself. And even when his great work appeared, (for although scarcely known to the public at first, and now almost forgotten, it is notwithstanding a *great work*—) the author still was as one speaking half a century in advance of his subjects, and without any common ground of understanding between himself and the public. He spoke of causes and effects as if of vital importance, of which the existence was scarcely known to his readers or the public; and his deductions were not understood, or, if understood, not believed. Thus his remarks in the following pages on the evils of the protecting duty and the banking and paper systems, might be supposed to have been uttered within the last ten years; but, in truth, they were first published during Jefferson's administration, when the public scarcely knew that a *protecting duty* existed, or that the system was then organized and had begun to operate—and when nothing but the *benefits* of banking and bank-paper (as supposed) had as yet been experienced. John Taylor's warnings were uttered long before any ground for them was suspected to exist; and it was therefore not at all strange that his precepts and warnings were disre-

garded, and even unheard. The remarkable and unfortunate obscurity of his style also rendered his writings repulsive to all readers who did not correctly appreciate the value of his matter, and helped to induce a degree of neglect approaching to early oblivion. But his precepts will yet be heard, and his wisdom and his merit as a political teacher will yet be acknowledged.

'Arator' is now out of print, and the existing copies are so scarce that distinguished agriculturists, attracted by the report of its former reputation, have sought in vain to procure or even to see a copy. It is true also that the demand of purchasers does not very much exceed the supply; and therefore that it is not likely that another edition would be published with the expectation of profit from the sales. Under these circumstances, the editor of the Farmers' Register has undertaken to publish a new edition, in this cheap form, as part of that journal; and deems that, in so doing, he will perform an acceptable service to the agricultural public, and especially to all those individuals who, like the editor, feel gratitude and reverence for the author.

PREFACE TO THE FOURTH EDITION.

BY THE AUTHOR.

The essays above the signature of Arator, were not preceded by an explanation of the motives by which they were dictated, or of the ends designed to be effected, because they were originally published in a newspaper without any anticipation of the form they have assumed. But being now stamped by the public acceptance with some degree of value, an account of these motives and ends may extend their efficiency, and promote the examination of subjects, so important and inexhaustible.

A conviction that the prosperity of our country depended upon a competent share of agricultural and political knowledge, and that an ignorance of either, would defeat the benefits naturally flowing from a proficiency in both, produced these essays and also a larger book, entitled "An Inquiry into the Principles and Policy of the Government of the United States," for the ends of advancing practical improvements in one science, and of preserving those we had already made in the other.

Agriculture and politics are primary causes of our wealth and liberty. Both contain internal good principles, but both are liable to practical deterioration. If one is vitiated in practice, poverty, if the other, oppression ensues. If the agriculture is good and the government bad, we may have wealth and slavery. If the government is good and the agriculture bad, liberty and poverty. To secure both wealth and liberty, an intimate knowledge of the good principles comprised in both, and a strict accordance in practice with those principles, must be indispensably necessary.

Hence results the propriety of awakening the people to the good principles of agriculture, and of keeping them awake to those of our form of government. Without commemoration, the latter might be lost, and without inquiry, the former

could never be found: Both subjects are vitally important to the success of the singular experiment now making by the United States upon the theatre of the world, and contain the only means of redeeming their pledge to mankind.

Both are treated of in the two books above mentioned. Arator is chiefly confined to agriculture, but it contains a few political observations. The Inquiry, to politics; but it labors to explain the true interest of the agricultural class. The affinity between the subjects, caused them to be intermingled. But the author never imagined himself able to tear the bandage of habit from the eyes of prejudice, nor to squeeze the tincture of corruption from the heart of avarice. Without aspiring to moral heroism, or to the renown of new inventions, he only attempts to extract good agricultural practices from his own experience, and good political measures from the wise and faithful archives of revolutionary patriotism, to increase the skill of his countrymen, in making good crops and in securing them for their own benefit.

That private industry, combined with political fraud, may make a nation wealthy and miserable, is exemplified in England. That one interest or class of men, may reap oppression from carrying their occupation to great perfection, appears in the state of the manufacturers of the same country. And a similar fate awaits the agricultural class of this, although it could be driven by English coercion even up to English perfection, unless it retains the American political principles, alone competent to defeat the arts, under which the productive classes of mankind are universally groaning.

Why are the agriculturists of the United States happier than those of England, under the great disadvantages of a worse system of agriculture, and of paying higher wages for labor? From the greater chastity of their political measures. The habit of drawing comparisons between our government and a foreign one, for the purposes of excusing abuses and lulling vigilance, is a treacherous delusion, and a tacit confession of an approximation towards them; but this reference is calculated to open the eyes of agriculture, to the contemplation of those foreign measures which have created reapers of its harvests, and swallows of its profits. If such detachments of foragers and marauders from the main body of the English nation, can intercept the great crops of the best existing system of agriculture, so as to cause frequent famines among the main body itself, it evidently suggests to us the wisdom of distinguishing between those establishments necessary for good government, and such as are contrived merely "*consumere fruges*;" that is, to live upon the industry of others, without rendering any services to the nation. To save our sorry crops from free quarter sinecures, is even more important and more urgent, than to amend our agriculture. It would secure to us comfort and happiness. By suffering frauds to pounce upon them, we cannot be made comfortable and happy, even by great crops. And the author ventures to assert, that whilst the readers of Arator will unanimously agree that its tendency is to improve our crops, those of the Enquiry belonging to the main body of society, or those detachments, will concur in the tendency of that book, to save them from becoming a prey to political frauds; one division by commending much, the other, by commending nothing.

No body will deny that an endeavor to increase our crops is laudable, but it is a question, whether it is equally laudable to save them from the nets of political "retarii," by teaching the plain honest yeomanry how to avoid the morification of starving upon them, however great. The opinion "that the more industry spends of its own earnings, and the less of them is intercepted by governments, or taken away by legal projects, the richer, the greater, and the happier will be the nation," if correct, resolves that doubt. No nation was ever oppressed, ruined or enslaved by the prodigality of individuals; all nations have suffered some of these evils from the prodigality of governments. Hence a plain political maxim forces itself upon the mind, sufficient to maintain a good government, if mankind possessed prudence enough not to ramble into intricacies contrived on purpose to entrap them; namely, "that national prosperity and liberty are safe, endangered or lost, in proportion as individuals retain, or governments acquire, the investiture or disposition of the earnings of industry."

The author had another reason for uniting the subjects of agriculture and politics. He considered agriculture as the guardian of liberty, as well as the mother of wealth. So long as the principles of our government are uncorrupted, and the sovereignty of majorities remains, she must occupy the highest political station, and owe to society the most sacred political duty. It is as incumbent upon her to learn how to protect defenceless minor interests, as to defend herself. And whilst the security for her patriotism, "that she cannot find any body worth plundering," exists, she should take care not to betray her wards, by suffering herself to be made poor, either by a deficiency of skill and industry, or by legal spoliations; because wealth is power. She must be rich to be powerful, and she must be powerful to discharge faithfully the sacred obligation she owes to society by constituting the majority. If her wealth is transferred, her power will go with it, and an irresistible political influence will be acquired by a minority, which can find some body worth plundering.

The thin soil of the United States, renders political frauds particularly grievous to agriculture, from its insufficiency to bear them; and the thin population, exposes us particularly to the evils of invasion. The population, necessary to contract or prevent these evils, can never be obtained, except by enriching the soil, and the soil cannot be enriched, except by legislative co-operation with individual industry, by forbearing to transfer wealth from an application to these great national objects, to the encouragement of doubtful projects, or the diffusion of a pernicious degree of luxury. Laws shed a good or a bad influence upon all social employments, and operate most extensively upon that which is most general. Why have so many employments, expensive, useless or pernicious, flourished wonderfully in the United States, whilst the fertility of the soil has been wonderfully diminishing? Can it be ascribed to any cause but a baleful legal influence? Of what avail will be agricultural books, or societies, or individual industry, to improve the soil and strengthen the population, opposed to a system of legislation dispensing impoverishment? Of the same, experienced by societies and books for improving the representation of the British house of commons.

Legislatures must begin to notice and discuss the state of agriculture, before they can discover or remove the causes of the cadaverous countenance exhibited by the soil. These causes lie concealed in the laws. It is strenuously contended that laws are able to administer prosperity or decay to occupations of inferior utility to man, and less interesting to nations in general, and to the United States in particular, by exciting or discouraging the degree of ardor, inspired by an equal footing between the various objects of industry. Such an equipoise of justice among occupations, is in fact an equipoise of liberty among men, and constitutes the only sound test of a free government. But it is admitted that laws may both create and bestow upon particular interests wealth and power, and yet if we even exclude from the question the injuries thence resulting to other interests, it ought to be considered that they gradually suppress the idea of a government guided by the common good, and plant in its place by a succession of precedents, a system of partiality to be exercised by power without limitation, and capable of demolishing every barrier against usurpation and tyranny.

If our government, however, will usurp a boundless sovereignty over the industry and property of individuals, the policy of invading the great province of agriculture, to gather spoils for enriching a number of little barren districts, is still to be questioned. If agriculture, for instance, is as insignificant as banking, it has the same claim to legal favor; if less so this claim becomes stronger. From what motives have legal partialities in all countries selected their favorites? Even religion has often been converted into the spirit of folly, or the instrument of wickedness. Will they regard human occupations with more veneration? These only are left in our country exposed to the same motives which have begotten the whole tribe of legal partialities abroad, and are therefore more likely to be laid hold of with furious eagerness, and to be mangled with barbarous outrage.

Already, many members of the body politic, and even sundry excrescences which ought to be amputated, are excited up to a fever, and agriculture chilled at the heart by drafts to bestow an unnatural degree of heat upon less valuable or pernicious extremities. If our health was sound during the presidency of Washington, what must it now be? The pulsation has increased six fold in the limb of taxation; in the excrescence of banking, fifty fold; in that of protecting duties enormously; and in the patronage limb, its flutterings have become so rapid and indistinct, that congress have ordered a book to be compiled, to explain what may be called the logarithms of patronage. A healthy state of society must consist in that equable pulsation throughout all its parts, produced by an equipoise of justice, favor and protection among its several interests. Unless this is restored by amputations, retrenchments, and evacuations, agriculture cannot for ages exhibit on the soil, an equivalent degree of prosperity, which she ought in common with other interests to derive from the revolution.

Finally, if the defence of partial laws, "that the sufferings they inflict on one person or class, ought to be balanced against the acquisitions they bestow on another," though false, immoral and tyrannical,

are allowed to be true, virtuous, and fair, yet it ought at least to be examined by the principle it asserts. Compare then the gain from a bounty on snuff, with the loss sustained by a tax on barley. The latter in some states, owing to the deficiency of this agricultural manufacture, amounts probably upon grain only, to twenty per centum annually. Add to this loss the whole mass of agricultural suffering, arising from the whole deprivation of capital, and compare the total, with the total gain to manufactures from protecting duties. In fact, the principle resorted to for defence by partial laws, ever was and ever will be used by governments, only to increase their power, by accumulating money at the cost of nations, to be wasted in extravagance or employed still more perniciously, in extending patronage, or spreading corruption. Under shelter of the delusion, they advance step by step towards arbitrary power, and that interest which is most productive, and covers a majority, inevitably becomes its victim, unless it detects the fraud. Agriculture can never flourish, unless it applies a very different principle both to its land and its government, namely, "that renewal must constantly follow close upon the heels of decay, either to maintain fertility or to avoid oppression."

PREFACE.

BY THE PUBLISHER OF THE THIRD EDITION.

The publisher of the following essays is the first who has offered to the public patronage an experimental composition, adapted to the soil, climate and agriculture of the greater portion of the United States; and so far as his knowledge extends, it is the first of the kind which this great district of country has produced. He is not qualified to judge of its merit, and can only infer from its being the work of a successful practical farmer, and not the offspring of interest or theory, that every purchaser will be reimbursed his money many fold. But, however this may be, the publisher respectfully states, that rude inventions have terminated in great public good; and that the deficiency of graphical merit in the agricultural country, for which the composition was intended, is almost as strong a recommendation of this effort towards improvement, as the hieroglyphics of antiquity, were of those made for the discovery of letters. An encouragement of small improvements is the parent of perfection in every art and science, and as agriculture is the queen of the whole circle, the publisher has thought it his duty to give the public an opportunity of awakening better talents and greater exertions, for occupying the extensive space between its present and a desirable condition.

The United States have been charged with a dearth of original compositions. Their reach of European books is the reason of the fact, so far as it extends to moral subjects; whilst the multitude, novelty and usefulness of their mechanical inventions, repels an insinuation, that it arises from a want of genius or industry. The strongest ground of the charge is, the deficiency of native books

upon agriculture. Whilst the country was fresh, it was natural for the inhabitants to neglect the subject in the midst of abundance; but its evident impoverishment, ought to have suggested to us the necessity of native remedies for local errors; and the incongruity of English books upon agriculture, with the climates, soils and habits of the United States. This incongruity, by drawing ridicule upon imitators, too often extinguishes a patriotic ardor, and checks instead of advancing improvement.

If the book now offered to the public should have no other good effects but those of suggesting the necessity of writing for ourselves on the subject, and introducing some taste for such discussions, the compensation to the publisher for his labor will be amply repaid. To this taste, the agriculture of Europe in general, and of Britain in particular, is indebted for a vast improvement within the last century, and a similar spirit in the United States will undoubtedly produce similar ef-

fects. Every class of men will be benefited by it. The *merchant* will receive more produce, and sell more goods. The demands upon the *manufacturer* will extend to more and finer commodities. *Lawyers* and *physicians* will have richer clients and patients, and receive better fees. The *politician* may find more resources for defending his country, maintaining her independence and rewarding patriotism. The *printers* will sell more books and newspapers. And the *farmer*, though the fountain from which all these benefits must flow, as receiving first the fruits of improvement, will make them subservient to his own happiness, before he diffuses them to advance the happiness of others. A tendency to shed prosperity over all these classes, has some claim to general encouragement, and whilst the publisher respectfully solicits the public patronage on this ground, he also confidently hopes, that a considerable portion both of amusement and information will be found in the following sheets.

ARATOR.

THE PRESENT STATE OF AGRICULTURE.

I shall consider, in a succession of short essays, the present state of agriculture in the United States, its oppressions and defects, and the remedies, political and domestic, which it needs. It is confessed, however, that the chief knowledge of the author, as to modes of agriculture, is confined to the states of Maryland, Virginia and North-Carolina. And therefore, whilst his remarks in relation to its political state, will generally apply to the whole union, those in relation to these modes, will particularly apply to all states using slaves, or to the three enumerated states.

Mr. Strickland, an Englishman, reputed to be sensible and honest, published at London, in the year 1801, a pamphlet upon the agriculture of the United States, being the result of his own observation, during a considerable period spent in travelling through the country, for the special purpose of investigating it. The judgment of this impartial stranger appears in the following quotations.—Page 26: "Land in America affords little pleasure or profit, and appears in a progress of continually affording less."—P. 31: "Virginia is in a rapid decline."—P. 38: "Land in New-York, formerly producing twenty bushels to the acre, now produces only ten."—P. 41: "Little profit can be found in the present mode of agriculture of this country, and I apprehend it to be a fact that it affords a bare subsistence."—P. 45: "Virginia is the southern limit of my inquiries, because agriculture had there already arrived to its lowest state of degradation."—P. 49: "The land owners in this state are, with a few exceptions, in low circumstances; the inferior rank of them wretched in the extreme."—P. 52: "Decline has pervaded all the states."

These conclusions, if true, are awfully threatening to the liberty and prosperity of a country, whose hostage for both is agriculture. An order of men, *earning a bare subsistence, in low circumstances, and whose inferior rank is wretched in the extreme*, cannot possibly constitute a moral force, adequate to either object. It is therefore

highly important to the agricultural class, to ascertain whether it is true, that agriculture is in a decline. A decline terminates like every other progress, at the end of its tendency.

Upon reading the opinion of this disinterested foreigner, my impressions were, indignation, alarm, conviction; inspired, successively, by a love for my country, a fear for its welfare, and a recollection of facts.

The terrible facts, that the strongest chord which vibrates on the heart of man, cannot tie our people to the natal spot, that they view it with horror, and flee from it to new climes with joy, determine our agricultural progress, to be a progress of emigration, and not of improvement; and lead to an ultimate recoil from this exhausted resource, to an exhausted country.

A patient must know that he is sick, before he will take physic. A collection of a few facts, to ascertain the ill health of agriculture, is necessary to invigorate our efforts towards a cure. One, apparent to the most superficial observer, is, that our land has diminished in fertility. Arts improve the work of nature—when they injure it, they are not arts, but barbarous customs. It is the office of agriculture, as an art, not to impoverish, but to fertilize the soil, and make it more useful than in its natural state. Such is the effect of every species of agriculture, which can aspire to the character of an art. Its object being to furnish man with articles of the first necessity, whatever defects that object, is a crime of the first magnitude. Had men a power to obscure or brighten the light of the sun, by obscuring it, they would imitate the morality of diminishing the fertility of the earth. Is not one as criminal as the other? Yet it is a fact, that lands in their natural state, are more valuable, than those which have undergone our habit of agriculture, of which emigrations are complete proofs.

The decay of a multitude of small towns, so situated as to depend for support on unalterable districts, is another proof of the impoverishment of the soil. It is true, that a few large towns have grown up, but this is owing, not to an increased

product, but to an increased pasture; whereas, in every case, where the pasture is limited, or isolated by local circumstances, small towns have sprung up, whilst the lands were fresh, and decayed, as they were worn out. I have no facts to ascertain certainly the products of agriculture at different periods relatively to the number of people; such would furnish a demonstration of its state. But I have understood, that sixty thousand hogsheds of tobacco were exported from Virginia, when it contained about one-fourth of its present population. If so, had the fertility of the country remained undiminished, Virginia ought now to export two hundred and forty thousand hogsheds, or an equivalent. In this estimate, every species of export except tobacco, is excluded at one epoch, and exports of every kind included at the other; yet the latter would fall far short of exhibiting the equivalent necessary to bring itself on a footing, as to agriculture, with the former. Two hundred and forty thousand hogsheds of tobacco, which, or an equivalent, Virginia would now export, if the state of agriculture had been as flourishing as it was sixty or seventy years past, at the present value, by which all our exports are rated, would be worth above seventeen millions of dollars; and supposing Virginia to furnish one-seventh part of the native agricultural exports of the United States, these ought now to amount to one hundred and twenty millions of dollars, had the products of agriculture kept pace with the increase of population. If this statement is not exactly correct, enough of it certainly is so, to demonstrate a rapid impoverishment of the soil of the United States.

The decay of the culture of tobacco is testimony to this unwelcome fact. It is deserted because the lands are exhausted. To conceal from ourselves a disagreeable truth, we resort to the delusion, that tobacco requires new or fresh land; whereas every one acquainted with the plant knows, that its quantity and quality, as is the case with most or all plants, are both greatly improved by manured land, or land, the fertility of which has been artificially increased. Whole counties, comprising large districts of country, which once grew tobacco in great quantities, are now too sterile to grow any of moment; and the wheat crops, substituted for tobacco, have already sunk to an average below profit.

From the mass of facts, to prove that the fertility of our country has long been declining, and that our agriculture is in a miserable state, I shall only select one more. The average of our native exports is about forty millions of dollars annually. Some portion of this amount consists of manufactures, the materials for which are not furnished by agriculture; another, as is extensively the fact in the case of flour, has passed through the hands of the manufacturer. Of the first portion he receives the whole price, of the second a proportion. And a third portion of our products is obtained from the sea. Of the forty millions exported, agriculture, therefore, receives about thirty-five. The taxes of every kind, state and federal, may be estimated at twenty millions of dollars, of which agriculture pays at least fifteen, leaving twenty millions of her exports for her own use. Counting all the slaves, who ought to be counted both as sources of product and expense, in estimating the state of agriculture, the people of the United States may probably amount to about seven mil-

lions, and it may be fairly assumed, that the interest or occupation of six millions of these seven, is agricultural. Of the whole surplus product of agriculture exported, after deducting the taxes it pays, there remains for each individual a few cents above three dollars. Out of this mass of profit, he is to pay for the manufactures, luxuries and necessities he consumes, not raised by himself; and the only remaining article to be carried to the credit of agriculture, is the small gain it derives from its domestic sales, not to itself, or from sales by one of its members to another, for that does not enrich it, but to other classes, such as manufacturers and soldiers. Against the former, agriculture is to be debited with the bounties she is made by law to pay them; against the latter, she has been already debited by deducting her taxes from her exports. Neither can be a source of much wealth or profit to her, because in one case she furnishes the money by taxation, and in the other by bounties, with which her products are purchased. It is, therefore, nearly true, that the income of agriculture is only three dollars per poll, and that this income is her whole fund for supplying her wants and extending her improvements. This estimate is infinitely more correct, than one drawn from individual wealth or poverty. To infer from the first, that every body might become rich, as a defence of our agricultural regimen, would be a conclusion as fallacious, as to infer from the second, that every body must become poor, as a proof of its badness. Extraordinary talents or industry will produce extraordinary effects. Instances of happiness or wealth under a despotism, do not prove that its regimen is calculated for general wealth or happiness. A system, commercial, political or agricultural, so wretched as not to exhibit cases of individual prosperity, has never appeared, because a universal scourge would be universally abhorred. It is not from partial, but general facts, that we can draw a correct knowledge of our agriculture. Even a personal view of the country, might deceive the thoughtless, because neither the shortness of life, nor the gradual impoverishment of land, are calculated to establish a visible standard of comparison. A man must be old and possess a turn for observation from his youth, to be able to judge correctly from this source. I have known many farms for above forty years, and though I think that all of them have been greatly impoverished, yet I rely more upon the general facts I have stated, for agreeing with Strickland in opinion, "that the agriculture of the United States affords only a bare subsistence—that the fertility of our lands is gradually declining—and that the agriculture of Virginia has arrived to the lowest state of degradation."

THE POLITICAL STATE OF AGRICULTURE.

In collecting the causes which have contributed to the miserable agricultural state of the country, as it is a national calamity of the highest magnitude, we should be careful not to be blinded by partiality for our customs or institutions, nor corrupted by a disposition to flatter ourselves or others. I shall begin with those of a political nature. These are a secondary providence, which govern

unseen the great interests of society; and if agriculture is bad and languishing in a country and climate, where it may be good and prosperous, no doubt remains with me, that political institutions have chiefly perpetrated the evil; just as they decide the fate of commerce.

The device of subjecting it to the payment of bounties to manufacturing, is an institution of this kind. This device is one item in every system for rendering governments too strong for nations. Such an object never was and never can be effected, except by factions legally created at the public expense. The wealth transferred from the nation to such factions, devotes them to the will of the government, by which it is bestowed. They must render the service for which it was given, or it would be taken away. It is unexceptionably given to support a government against a nation, or one faction against another. Armies, loaning, banking, and an intricate treasury system, endowing a government with the absolute power of applying public money, under the cover of nominal checks, are other devices of this kind. Whatever strength or wealth a government and its legal factions acquire by law, is taken from a nation; and whatever is taken from a nation, weakens and impoverishes that interest which composes the majority. There, political oppression in every form must finally fall, however it may oscillate during the period of transit from a good to a bad government, so as sometimes to scratch factions. Agriculture being the interest covering a great majority of the people of the United States, every device for getting money or power, hatched by a fellow-feeling or common interest, between a government and its legal creatures, must of course weaken and impoverish it. Desertion, for the sake of reaping without labor, a share in the harvest of wealth and power, bestowed by laws at its expense, thins its ranks; an annual tribute to these legal factions, empties its purse; and poverty debilitates both its soil and understanding.

The device of protecting duties, under the pretext of encouraging manufactures, operates like its kindred, by creating a capitalist interest, which instantly seizes upon the bounty taken by law from agriculture; and instead of doing any good to the actual workers in wood, metals, cotton or other substances, it helps to rear up an aristocratical order, at the expense of the workers in earth, to unite with governments in oppressing every species of useful industry.

The products of agriculture and manufacturing, unshackled by law, would seek, each for themselves, the best markets through commercial channels, but these markets would hardly ever be the same; protecting duties tie travellers together, whose business and interest lie in different directions. This ligature upon nature, will, like all unnatural ligatures, weaken or kill. The best markets of our agriculture lie in foreign countries, whilst the best markets of our manufactures are at home. Our agriculture has to cross the ocean, and encounter a competition with foreign agriculture on its own ground. Our manufactures meet at home a competition with foreign manufactures. The disadvantages of the first competition, suffice to excite all the efforts of agriculture to save her life; the advantages of the second suffice gradually to bestow a sound constitution on manufac-

turing. But the manufacture of an aristocratical interest, under the pretext of encouraging work of a very different nature, may reduce both manufacturers and husbandmen, as Strickland says is already effected in the case of the latter, "to the lowest state of degradation."

This degradation could never have been seen by a friend to either, who could afterwards approve of protecting duties. Let us take the article of wheat to unfold an idea of the disadvantages which have produced it. If wheat is worth 16s. sterling in England the 70lb. the farmers sell it here at about 6s. sterling.—American agriculture then meets English agriculture in a competition, compelling her to sell at little more than one third of the price obtained by her rival. But American manufacturers take the field against English on very different terms. The competitors meet in the United States. The American manufacturers receive, first, a bounty equal to the freight, commission and English taxes, upon their English rivals: and secondly, a bounty equal to our own necessary imposts. Without protecting duties, therefore, the American manufacturer gets for the same article, about 25 per cent. more, and the American agriculturist about 180 per cent. less, than their English rivals. Protecting duties added to these inequalities, may raise up an order of masters for actual manufacturers, to intercept advantages too enormous to escape the vigilance of capital, impoverish husbandmen, and aid in changing a fair to a fraudulent government; but they will never make either of these intrinsically valuable classes richer, wiser or freer.

In this number I shall consider a reason for protecting duties to encourage manufactures, which, if it is sound, overturns the whole argument against them. In every essay on behalf of manufactures, we are told, that by creating this class with bounties and privileges, we shall both make ourselves independent of foreign nations, and also provide a market for agricultural labor, as an aristocracy, in all its forms, is a market for labor. And the high price of wheat in England, is contrasted with its low price here, to prove the latter assertion. It would be sounder reasoning to contrast the high price of manufactures here, with the low price there, to prove that they ought to give bounties to agriculture to provide a market for manufactures. Nations and individuals are universally promised wealth by political swindlers.—The English price for wheat, is coupled with the English political system. Without adopting the causes of that price, the effects springing from these causes cannot follow. The idle classes of the nobility, clergy, army, navy, bankers and national debt holders, with their servants and dependents, are the items of an aristocracy, which has reduced the agricultural class to a poor and powerless state, by the juggle of persuading it to buy high prices, by creating and maintaining these idle classes. The national debt alone maintains more people, than there are agriculturists in Britain. These do not amount to a tenth part of the nation. It is to this combination of causes, and not to manufacturers singly, that the English agriculture is indebted for its high prices.

These very prices are themselves proofs of the oppression which produced them. They are the effect of the tendency which industry has to recover back some equivalent from fraud, and of the

necessity of fraud to extend some encouragements to industry. But shall we oppress our agriculture, merely to demonstrate that abuses have a tendency to excite countervailing efforts, and load it with English impositions, for the sake of the inadequate reimbursements of English prices?

Let him who hopes to live to see the agricultural class of the United States, reduced by English policy to a tenth part of the nation, undertake to prove, that such a reduction would be a proof of its prosperity. If he could defend such a theory, he would at last be practically disappointed, unless our manufacturers should drive the English manufactures out of the world, and occupy their place. The ingenious device of agriculture in England, in bestowing money on noble, clerical, military and chartered idlers, for the sake of selling its products to get back a part of its own, would turn out still more miserably, except for the vast addition to the manufacturing class, by foreign demands for its labor. If England only manufactured for herself, her manufactures would constitute but a wretched market for agriculture. One laborer feeds many manufacturers. One manufacturer supplies many laborers. Before the promise of English prices for bread and meat, tobacco and cotton, can be realized, from driving in manufacturing by protecting duties, we must be able to drive out manufactures by protecting fleets into every quarter of the globe; and so like some booby heirs, take up a parent's follies, at the period he is forced to lay them down.

Still more hopeless is the promise of the manufacturing mania, "that it will make us independent of foreign nations," when combined with its other promise of providing a market for agriculture. The promise of a market, as we see in the experience of England, can only be made good, by reducing the agricultural class to a tenth part of the nation, and increasing manufacturers by great manufacturing exportations. This reduction can only be accomplished by driving or seducing above nine-tenths of the agricultural class, into other classes, and the increase by a brave and patriotic navy. Discontent and misery will be the fruits of the first operation, and these would constitute the most forlorn hope for success in the second. By exchanging hardy, honest and free husbandmen for the classes necessary to reduce the number of agriculturists, low enough to raise the prices of their products, shall we become more independent of foreign nations? What! Secure our independence by bankers and capitalists? Secure our independence by impoverishing, discouraging and annihilating nine-tenths of our sound yeomanry? By turning them into swindlers, and dependents on a master capitalist for daily bread.

There are two kinds of independence, real and imaginary. The first consists of the right of national self-government; the second of individual taste or prejudice. The yeomanry of the forest are best calculated to preserve the first, and the yeomanry of the loom are best calculated to feed the second. A surrender of the first to obtain the second, would be a mode of securing our independence, like England's converting her hardy tars into barbers and tailors, in order to become independent of French fashions.

The manufacturing mania accuses the agricultural spirit of avarice and want of patriotism,

whilst it offers to bribe it by a prospect of better prices, whittles down independence into cargoes of fancy goods, and proposes to metamorphose nine-tenths of the hardy sons of the forest into every thing but heroes, for the grand end of gratifying the avarice of a capitalist, moneyed or paper interest.

Opinion is sometimes prejudice, sometimes zeal, and often craft. These counterfeits of truth have universally deluded the majority of nations into the strange conclusion, that it will flourish by paying bounties to undertakers for national salvation, for national wealth, and for national independence. The first imposture is detected, the second begins to be strongly suspected, but the third has artfully provoked its trial, at a moment when it can conceal the cheat under the passions excited by transitory circumstances. Hatred of England, a pretended zeal for national honor, and the real craft of advancing the pecuniary interest of a few capitalists, have conspired to paint a protecting duty system, into so strong a resemblance of patriotism and honesty, as to lead agriculture by a bridle made of her virtue and ignorance, towards the worship of an idol, compounded of folly and wickedness.

English agriculture has completely tried the project of enriching itself, by buying markets with bounties. It has provided more of these markets, than the agriculture of any other nation. Yet it is unable to feed its own people, many of whom are indebted to foreign agriculture for daily bread. No profession in England is deficient in hands, but the agricultural, and none other a cypher in government. They have lords, bishops, officers civil and military, soldiers, sailors, bankers, loaners and capitalists in abundance, and all of them have an influence in the government. These are the markets in which the English agriculturists have successively laid out their money, in order to get good prices, and the more of these markets they buy, the less liberty and wealth they retain.

If the agriculture of the United States would only consider how it happens, that it can yet live upon six shillings sterling a bushel for wheat, when the English agriculture is perishing with sixteen, the film drawn over its eyes by the avarice with which those charge it, who design to cheat it, would fall off. The solution of the apparent wonder, lies in the delusion of buying price by bounties. The bounties are partly, but never completely, reimbursed by the price. Though the payer of the bounties gets more price, he gains less profit than from the lower price, when he paid no bounties. Therefore the receivers of the bounties become rich and idle, and the receivers of the price, poor and laborious. And this effect is inevitable, because the bounties must for ever outrun the prices they create, or nobody could subsist on them. If the bounty paid was equal to one shilling a bushel on wheat, and should raise the price nine pence, the receivers of the bounty would gain three pence a bushel on all the wheat of the nation, and agriculture would lose it, though it got a higher price. And this obvious fraud is precisely the result of every promise in every form made by charter and privilege to enrich or encourage agriculture.

The agriculture of the United States, found itself in the happiest situation for prosperity imaginable, at the end of the revolutionary war. It

had not yet become such an egregious gudgeon as to believe, that by giving ten millions of dollars every year to the tribe of undertakers, to make it rich, they would return it twenty; and it could avail itself of all the markets in the world, where this ridiculous notion prevailed. There were so many mines of wealth to the agriculture of the United States. The idle, clerical, military, banking, loaning, and ennobled classes, as has been stated, do certainly have the effect of raising agricultural prices very considerably; but the agriculturists who pay and maintain these classes, still lose more by them than they gain. Now the United States, as a section of the commercial world, might have shared in the enhancement of agricultural price, produced by such unproductive orders in other countries; and paid none of the ruinous expense of wealth or liberty, which they cost. They might have reaped the good, and avoided the evil. And agriculture, for once in its life, might have done itself justice. But the wise-acre chose to reap the evil, and avoid the good; and if its situation has been occasionally tolerable, it was sorely against its will, or by accident. In the first eight years after the revolution, being the first period, in the latter ages of the world, that agriculture could make laws, it legislated sundry items of the British system for buying markets or raising prices. In the next twelve, it nurtured their growth, so as to raise up some to a large, and one to a monstrous size; and also most sagaciously prohibited itself, first from sharing in the benefit of the high prices produced by aristocratical institutions in France, and secondly from sharing in those produced in the same way in England. European agriculture is gulled or oppressed by others; American, gulls or oppresses itself. The first is no longer weak enough to think, that its battalion of aristocratical items does it any good; but it is now unable to follow its judgment; the second, though able to follow its own judgment, has adopted the exploded errors heartily repented of by the first, and far outstrips it in the celerity of its progress towards a state of abject submission to other interests, by shutting out itself from markets enhanced at the expense of other nations; and at the same time by creating the English items of capitalists, or masters for manufacturers, bankers, lenders, armies and navies. Our true interest was to pay nothing for markets, spurious and swindling to those who buy them, and yet to share in their enhancement of prices. We have pursued a different course, and I do not recollect a single law, state or continental, passed in favor of agriculture, nor a single good house built by it since the revolution; but I know many built before, which have fallen into decay. Our agriculture is complimented by presidents, governors, legislators and individuals; and the Turks reverence a particular order of people as being also favored by heaven.

The arguments to prove the political errors under which our agriculture is groaning, may suggest a suspicion, that I am an enemy to manufactures. The fact is otherwise: I believe that protecting duties, or whatever else shall damp agricultural effort, and impoverish the lands of our country, is the only real and fatal foe to manufactures; and that a flourishing agriculture will beget and enrich manufactures, as rich pastures multiply and fatten animals. He, who killed the goose to

come at her golden eggs, was such a politician, as he who burdens our expiring agriculture, to raise bounties for our flourishing manufactures.—He kills the cause of the end he looks for.

I meet such an insinuation by another argument. Protecting duties impoverish and enslave manufacturers themselves, and are so far from being intended to operate in their favor, or in favor of a nation, that their end and effect simply is to favor moneyed capital, which will seize upon and appropriate to itself, the whole profit of the bounty extorted from the people by protecting duties; and allow as scanty wages to its workmen as it can. Moneyed capital drives industry without money out of the market, and forces it into its service in every case where the object of contest is an enormous income. The wages it allows to industry are always regulated by the expense of subsistence, and not by the extent of its gain. Moneyed capitalists constitute an essential item of a government modelled after the English form. To advance this item, for the sake of strengthening the government against the people, and not for the sake of manufacturers, is the object of protecting duties. True, will say many a reader, but that is not the design here. Oh! how reverential is the logician, who can prove, that an axe will cut under a monarchy, but not under a republic.

Some king, I believe, requested the mercantile class of his subjects, to ask of him a favor. The greatest, your majesty can grant us, said they, is, to let us alone. Protecting duties are such favors to manufacturers, as the pretended favors of kings are to merchants. They impoverish their customers, the agriculturists, and place over themselves an order of masters called capitalists, which intercepts the profit, destined, without legal interposition, for industry. Many other arguments might be urged to prove that protecting duties beget the poverty of manufacturers, but this is not my subject. To that I return.

The bitterest pill which the English government compelled our agriculture to swallow before the revolution was, the protecting duty pill, or an equivalent drug, gilded with the national advantage of dealing with fellow subjects; and, after having gone through a long war to get rid of this nauseous physic, we have patiently swallowed it, gilded also by other doctors with the national advantage of dealing with fellow citizens: The power and wealth of the political doctors, who have recommended these self same political drugs, depended considerably in both cases, on their being swallowed.

I will suppose that our protecting duties do not exceed the average amount of 25 per centum, that they had expelled every article of foreign manufacture, and bestowed on our brother citizens a complete monopoly of our manufactural wants, and an ability to supply them. I will suppose too in favor of a project, which must depend on concessions to obtain the respect of examination, that the agricultural interest shall be able, after this blessed desideratum of the protecting duty system is obtained, to get at its old markets the same price for its products, and annually bring home the whole in gold or silver, for the use of our own capitalists and monopolizers. This, have said many great ministers of state, who had no knowledge of agriculture, would complete its prosperity.

It is the prosperity of giving one fourth above

the market price for all the manufactures it needs. It is the boon of returning with empty ships from ports, at which the same things can be bought for one fourth less. It is the boon of a direct tax or a system of excise, to supply the revenue, which the success of this project would annihilate.

The blessing of complete success in the plan of expelling foreign manufactures, by raising bounties upon agriculture, may be exhibited by figures upon data, however conjectural in amount, correct in principle. Suppose agriculture annually to bring home forty millions of dollars, she would be annually robbed of ten millions, by a protecting duty of 25 per centum, for the benefit of capitalists. Suppose her share of the taxes, state and continental, to be 15 millions, and that out of the remaining fifteen, she has five millions to pay to bankers; ten will remain, leaving her an annual income per poll, of about \$1.60 for building houses, paying expenses, and improving lands. But if we take into the account, that foreign nations neither would nor could pay our agriculturists with specie for their produce, that they would countervail upon this preposterous project, and that every countervailing act of theirs, would operate upon our agricultural products, even this \$1.60 would become the victim of retaliation, and leave the farmer as fundless for purchasing manufactures, as for improving his land.

This blessed scheme of shutting up its markets, for the encouragement of agriculture, has been wonderfully overlooked as a means for encouraging manufactures. In the latter case, markets are eagerly sought for, and barter universally allowed. England takes special care not to limit the sales of her manufacturers directly or indirectly to returns in specie, knowing that the attempt would destroy them. She endows them with the home monopoly, and freedom to make the best bargains in all the foreign markets they can get to. Manufacturing is her staple; agriculture is ours.

The United States hit exactly upon the same mode for the encouragement of our agriculture after the revolution, that the English did before it, for the purpose of pillaging it. Every congress has adhered to their predecessors in the same policy. The agriculturists, to get rid of it, fought England, and having evinced their power to control a great nation, are quietly submitting to this spectre of patriotism.

The English before the revolution, quartered upon our agriculture, a necessity of buying its manufactures at home, or within the empire, whilst it enjoyed the equivalents of being free from their taxation, from paying any of the interest of their paper systems, from contributions for supporting their armies, navies, bishops and pensioners, from the frauds of their treasury system, and of sharing in the enhanced prices, produced by fraud which did not reach the provinces. The same system inflicted by congress, is attended with none of these equivalents. Agriculture pays and must for ever pay most of whatever is collected by taxes, by charters, by protecting duties, by paper systems of every kind, for armies, for navies, and though last, not the least of its losses, of whatever the nation is defrauded by a treasury system operating in darkness. If the taxes are directly laid on property, agriculture pays nearly the whole of them; if on consumptions, an unequal share, because of the greater number

of hands she employs than any other business, and the smaller profit derived from their labor. Had our policy, instead of assailing agriculture, with the English system of quartering upon her a legion of legal separate interests (to resist which she had spent her blood and treasure in a long war with that nation) been guided by these considerations, she would not have been subjected to the very evils, to avoid which, she had so recently and gloriously persevered through that war.

The effects of yoking agriculture to armies, navies, paper frauds, treasury frauds, and protecting duty frauds since a revolution which it labored for, like the ox, who tills the crop to be eaten by others, are visibly an increase of emigration, a decrease in the fertility of land, sales of landed estates, a decay and impoverishment both in mind and fortune of the landed gentry, and an exchange of that honest, virtuous, patriotic and bold class of men, for an order of stock-jobbers in loans, banks, manufactories, contracts, rivers, roads, houses, ships, lotteries, and an infinite number of inferior tricks to get money, calculated to instil opposite principles.

All the varieties of this order receive bounties, and agriculture pays them. They gain from six to twenty per centum profit on their capitals; agriculture seldom or never gains six, except in a few southern instances. In fact, it very rarely gains any thing, if an income, derived from an impoverishment of the land, ill deserves the name of profit.

The injustice of superadding upon agriculture these unnecessary burdens to those which are necessary, is illustrated by supposing the duties upon foreign manufactures to be only five per centum, and nearly or quite all our duties are above the supposition. To such duties are still to be added the profits of the English and American merchants, through whose hands the goods pass, and the freight. These duties, profits and freight, would alone constitute an encouragement to home manufactures of at least twenty per centum; a sum quite adequate to any encouragement which honest policy would defend, or common justice suffer. And as all the occasional calamities of commerce, are losses to agriculture, and prizes to manufactures, her fatuity in kneeling like the camel to receive burdens, under the notion that she is receiving bounties, can have no antithesis more perfect, than the species of dexterity which inflicts them.

Protecting duties to enrich manufactures, are like banks to enrich farmers, bishops to save souls, or feudal lords to defend nations. England has demonstrated the character of each member of this kindred quatumvirate. Protected by feudal lords, it was conquered almost by every invader; taught by bishops, corruption, having been distilled through all inferior ranks, deposits its essence in this reverend order of servility and selfishness; enriched by bankers, farmers flee from the cultivation of lands, which yield the highest nominal returns to agricultural labor of any in the world, until a surplus of bread is exchanged for a deficiency; and fed with the endless bounties of protecting duties, one-sixth of the laboring manufacturers, constantly occupy prisons or poor houses, whilst the rest may be said to die daily upon their daily wages.

Monarchies and aristocracies, being founded in

the principle of distributing wealth by law, can only subsist by frauds and deceptions to dupe ignorance into an opinion, that such distributions are intended for its benefit; but in genuine republics, founded on the principle of leaving wealth to be distributed by merit and industry, these treacheries of government are treasons against nations.

They substitute the principle which constitutes an aristocracy, for the principle which constitutes a true republic; strike with a fatal ignorance, or a sordid malignity, at the heart of the political system; and effect a fraudulent and treasonable revolution.

My fellow laborers, mechanical or agricultural, let us never be deluded into an opinion, that a distribution of wealth by the government or by law, will advance our interest. We are the least successful courtiers of any rank in society, and of course have the worst prospect of sharing in any species of wealth, bestowed by governments. It is both contrary to the experience of all mankind, and even impossible. We constitute the majority of nations. A minority administers governments and legislates. Compare the probability of its taking wealth from itself to give it to the majority, with that of its defrauding the majority to enrich itself and its partisans, and you will account for the regular current of experience. Consider, however splendidly a minority may live upon the labors of a majority, that a majority cannot subsist upon those of a minority, and you will see that it is impossible for experience in future to teach a different lesson.

Let us not flatter ourselves, that laws can be made to enable majorities to plunder these minorities, or to plunder themselves: or to fatten a man by feeding him with slices cut from his own body. If a scheme could be contrived in favor of agriculture, similar to the protecting duty scheme in favor of manufacturers, it would enslave the farmers as it does manufacturers. The utmost favor which it is possible for a government to do for us farmers and mechanics, is neither to help nor hurt us. The first it cannot do; for whom can laws strip or famish, to clothe or feed the vast majority we compose? Aware that fraud or oppression cannot permanently subsist, except by feeding on majorities, those who compose these majorities, if they are wise, never fail to see that their interest points to a republican form of government, for the very purpose of preventing the passage of laws for quartering or pasturing on them minor interests. These majorities are the pasture upon which all minor factitious interests, however denominated, fatten; and it would be as unnatural for majorities to fatten upon such legal minor interests, as for pastures to eat the herds grazing on them.

The interest of labor covers every national majority, and every legal bounty is paid by labor. This interest cannot receive legal bounties, because there cannot exist a treasury for their payment. The utmost boon with which government can endow it, is the enjoyment of that portion of its own earning, which the public good can spare. Whenever bounties are pretended to be bestowed on labor, by privileges to feudal barons to defend it, to bishops to save it, or to capitalists or bankers to enrich it, an aristocratical order is unavoidably erected to pilfer and enslave it; because though majorities cannot be enriched or ennobled by bounties or privileges, minorities can; and these

bounties or privileges must of course settle, not against, but conformably with the laws of nature, both moral and physical.

The farce of legal favor or encouragement, has been so dexterously acted in England, to delude both the agricultural and mechanical interest, the interest of labor, or the majority of the nation, as to have delivered this majority, shackled by protecting duties, bounties and prohibitions, into the hands of an inconsiderable moneyed aristocracy, or combination of capitalists. Into this net, woven of intricate frauds and ideal credit, the majority of the nation, the interest of labor, the agriculturists and mechanics have run, after the baits held out by protecting duties, bounties and prohibitions. From its dreams of wealth it is awakened under the letters of a moneyed aristocracy, and unfortunate as Prometheus, it is destined to eternal and bitter toil to feed this political harpy, and to suffer excruciating anguish from its insatiable voraciousness. Sometimes this net has been baited to catch mechanics, at others to catch agriculturists, and perhaps it is but just, that these real brethren interests should fatten the alien tribe of stock-jobbers, as a punishment for manifesting a disposition to devour each other.

We farmers and mechanics have been political slaves in all countries, because we are political fools. We know how to convert a wilderness into a paradise, and a forest into palaces and elegant furniture; but we have been taught by those whose object it is to monopolize the sweets of life, which we sweat for, that politics are without our province, and in us a ridiculous affectation; for the purpose of converting our ignorance into the screen of regular advances, which artificial interests or legal factions, are for ever making in straight or zigzag lines, against the citadel of our rights and liberties. Sometimes, after one of these marauding families has pillaged for a thousand years, we detect the cheat, rise in the majesty of our strength, drive away the thief, and sink again into a lethargy of intellect so gross, as to receive him next day in a new coat, as an accomplished and patriotic stranger, come to cover us with benefits. Thus we got rid of tithes, and now we clasp bunks, patronage and protecting duties, to our bosoms. Ten per centum upon labor was paid to a priesthood, forming a body of men which extended knowledge, and cultivated good morals, as some compensations for forming also a legal faction, guided by the spirit of encroachment upon the rights and property of the majority. Forty per centum is now paid on our labor, to a legal faction guided by the same spirit, and pretending to no religion, to no morality, to no patriotism, except to the religion, morality and patriotism of making itself daily richer, which it says will enrich the nation, just as the self-same faction has enriched England. This legal faction of capitalists, created by protecting duties, bankers and contractors, far from being satisfied with the tithe claimed by the old hierarchy, will, in the case of the mechanics, soon appropriate the whole of their labor to its use, beyond a bare subsistence; though in the case of farmers, it has yet only gotten about four times as much of theirs, as was extorted by the odious, oppressive, and fraudulent tithe system. We know death very well, when killing with one scythe, but mistake him for a deity, because he is killing with four.

Prosperity, neither in manufactures, nor in paper speculations, is ever expected without a capital, and yet capital is filched from agriculture, under the pretence that it will produce her prosperity. The capital thus filched is made by laws to yield a better profit without labor, than it could with it, and becomes a premium offered by government to those who desert the labors of agriculture. Hence we see capital flying from the fields, to the legal monopolies, banking and manufacturing. The laws have established a thousand modes by which capital will produce quicker and larger profits, than when employed in the slow improvements of agriculture. These bribes offered to its deserters have already produced the most ruinous consequences. Avarice every where seizes them with avidity, and rails at agriculture, as sordid and unpatriotic, for wishing to withhold them, as the culture might have railed at Prometheus, for wishing to keep his liver. The best informed agriculturists are driven for self-defence, or seduced by the temptations of the wealth with which they are solicited, to sell their lands, which require labor, for the purchase of a better profit requiring none; or at least to divert to this object whatever capital accident or industry may have thrown into their hands. And the capital thus drained from the uses of agriculture, by this irresistible and perpetual legal system, has reduced it to a skeleton for want of nourishment.

Strickland, the English farmer, who came to this country with the intention of escaping from the agricultural oppressions of his own, and returned disgusted, discovered and described this death-inflicting operation in the 52d and 53d pages of his pamphlet. "Before the revolution," says he, "the capital of the country was vested in the lands, and the landed proprietors held the first rank in the country for opulence and information, and in general received the best education which America, and not unfrequently, Europe, could afford them." Now, "the capital, as well as the government of the country has slipped out of the hands of land owners; and these new people are employed in very different, and, in the present state of things, more productive speculations than the cultivation of lands; in speculations frequently at variance with the best interests of the country. In some of the states, the gentlemen of landed property have passed into perfect oblivion; in none do they bear the sway, or even possess their due share of influence." On the eleventh day of January, 1797, a committee was raised in congress for the promotion of agriculture, who reported: "That the encouragement of agriculture is an object highly worthy the public attention, as it constitutes the most useful employment for our citizens, is the basis of manufactures and commerce, and the richest source of national wealth and prosperity—and that the science of agriculture was in its infancy." One would have thought that these sentiments would have suggested the folly of starving this useful infant, to fatten the pernicious legal infant called capital; of compressing one into a dwarf, and stretching the other into a giant. No such thing. It was dandled a little. A toy for its amusement called the "American Society of Agriculture," was talked of. This toy was found to be unconstitutional, because it would add but little to the power of the general government, and the infant was turned to graze

in impoverished fields. The constitution was construed to exclude congress from the power of fostering agriculture by patents or bounties, and to give it the power of fostering banks and manufactures by patents and bounties; and a republican and agricultural people plunged into this absurdity to advance the project of a statesman in favor of monarchy. Agriculture, in its floundering, like an ox whilst breaking, gave the statesman a tumble, and then tamely submitted to the yoke he had fashioned.

As agricultural improvements cannot be made without capital; as capital will not be employed in them, if it can find more profitable employment; as the laws have created a variety of employments for capital, attracting it by bounties and premiums drawn from agriculture; and as this subtraction from one and addition to the others have caused capital invested under such legal patronage to be more profitable than when employed in agricultural improvements, it follows, that such improvements cannot take place, whilst a policy so completely fitted to counteract them, remains. Bring before your mind some twenty or thirty modes of employing capital, and imagine that one of them produces the least profit and most toil; and further, that this one is oppressed in various ways to advance the prosperity of all the rest. Could one of the emblems of agriculture himself (mentioned in the last number) conceive, that capital would fly from all the profitable modes to acquire comparative penury and exclusive toil in the service of the unprofitable mode; or be persuaded, that an utter destitution of capital can advance the prosperity of this one mode, whilst he is told on all hands, that capital alone can advance that of every other? This is not an imaginary, but a real case.

The project of creating a race of capitalists, as an engine to endow the government with more power, seems to me to be unfavorable to all the callings and interests of society, save to the calling of governing, and the calling of capitalists. Whilst agriculture is more particularly impoverished by it, that impoverishment contains a resulting blow for every thing which a fertile country and a flourishing agriculture nurtures; and the bounty of protecting duties will inflict upon the manufacturers themselves, or real workmen, in lieu of comfort and competence, which a multitude of them would gain by free industry, an impossibility of obtaining either, with the consolatory prospect of the vast wealth of their masters the capitalists.

Under the same system, England, the most fertile country in the world, wants bread. Arthur Young states, that a portion of that country, sufficing, if cultivated, to make England a great exporter of bread stuff, lies uncultivated. The average crop of wheat in England is about 35 bushels an acre, and the average price about 15s. a bushel sterling. Yet capital finds better employment under this system there, than in agriculture. This exorbitant price is therefore an insufficient equivalent for the oppression it suffers from the system. The average crop of wheat in some states is as low as five, in none above ten bushels to the acre, and the average price about five shillings sterling. Will one seventh or one fourth of the crops, and one third of the price here, enable agriculture to bear a system, under which, with a product and price, ten or twenty

fold better, it is not enabled to supply a nation with bread? An acre of wheat in England produces to the farmer 26l. 5s. sterling; here in some states 1l. 10s. in others 3l. sterling. And here the profits of money-jobbing, or capitalists, are as great as in England. If agriculture with such products and prices, is so bad a business there, compared with credit-jobbing, as to be unable to raise bread for the nation, what fate do our products and prices pronounce upon it here?

A material difference between the landed interest of the United States and of England, is the funeral dirge of the former. There it is distinct from agriculture, and associated with the aristocracy of capitalists. Here it is united with agriculture, and fated without equivalent to feed that aristocracy. There it is a landlord, here it is a tenant. There its rents supply it with capital to embark in the legal money sponges for absorbing the earnings of labor; here it is labor itself whose earnings these money sponges absorb. There it is fed with the most delicious morsels of royal patronage afforded by a system for pilfering, not landlords, but labor: here, but a few of these morsels fall to its share, and these have been previously carved from its own carcass. There the interest of idleness legislates, and it legislates in favor of idleness. Here the interest of labor legislates, and it also legislates in favor of idleness.

The political evils which bear upon agriculture, are a providence which will unalterably determine its fate, unless they are removed, and therefore the only remedy which can avert this fate is to remove them. I shall quote Strickland but once more, because his veracity is insufferable. I have selected hitherto his softest passages, for he asserts, that our soil is nearly a *caput mortuum*; that our landed property is no longer an object of profit or pleasure:—that few good houses are building in the country, or improvements of any kind taking place; and that the opulent are quitting it for the towns. But when he says, page 55, "the mass of those we should call planters or farmers, are ignorant, uneducated, poor and indolent," his veracity becomes insolent. Has Mr. Strickland forgotten, that we agriculturists had the sagacity to discover, that the English system of creating an order of capitalists, was levelled directly at our prosperity, and the magnanimous perseverance to get rid of its authors? Let him remember this achievement, and forget what has become of the system itself; and then he will certainly retract his severe censure upon our understandings and perseverance.

I would further ask Mr. Strickland, whether it is a very uncommon thing, even in his enlightened England, for the people to mistake the shadow for the substance, or to follow their passions in pursuit of the oppressor, rather than their reason in pursuit of the oppression. In short, are not the pages of history replete with instances of destroying the tyrant and retaining the tyranny? And why should we agriculturists be called ignorant and indolent, when we are only gulled, just as mankind in general, the enlightened citizens of Europe, and his own fellow subjects are gulled? Why should the good sense and constancy of regarding the principle rather than the agent, be exclusively expected of us?

It is, however, certainly true, that nothing can

flourish under oppression. Neither agriculture nor civil liberty can exist in declamations, or be toasted into prosperity. Our struggles, to resuscitate dying agriculture, must, like those of Sisyphus, yield to a stronger depressing power. The plough can have very little success, until the laws are altered which obstruct it. Societies for improving the breed of sheep, or the form of ploughs, will be as likely to produce a good system of agriculture, under depressing laws, as societies for improving the English form of government under their depressing system of corruption. A good pen may produce a very bad treatise.

Agricultural societies, to take a chance for success, must begin with efforts to elect into the general and state legislatures, a genuine agricultural interest, uncorrupted by stock-jobbing, by a view of office, or by odious personal vices; taking care to combine talents with this genuine character. Wise agricultural elections, constitute the only chance for abrogating a policy, which is the ruin of agricultural prosperity.

The bounties, frauds and useless expenses, which strengthen the government and corrupt the nation, and are drawing a vast annual capital from agriculture, would then be applied to the invigoration of the militia. Such a measure would return to manufactures and agriculture their own capital, and improve both the national soil and the national spirit. The nation would exchange ineffectual armaments for an irresistible ardor; an impoverishing, for an improving soil; disrespect for itself and its native haunts, for national pride and love of country; and a school of stock-jobbers and contractors, for a school of patriots. But agriculture and the militia receive abundance of praise and an abundance of oppression and neglect, nor can a mode of encouraging either by law be discovered, whilst no difficulty is felt in rearing up mercenary armies, and more mercenary capitalists, for the same reason. It is impossible by law to encourage agriculture and the militia, and also capitalists and standing armies.

The remedy of construing the constitution honestly is a simple one. It certainly intended to bestow as little power to tax agriculture, in order to raise a bounty for manufactures and credit corporations, as it does to tax manufactures, in order to raise a bounty for agriculture. Let the imposts be regulated by their constitutional intention, and agriculture will cease to be oppressed by bounties bestowed by statesmen out of her purse, to advance their own designs. The words and the spirit of the constitution are so entirely adverse to the idea of enabling congress to exercise a partiality equivalent to the ruin or opulence of states, relying distinctly upon agricultural or manufactural staples of commerce, that the unconstitutionality of the power ought to render the policy of its exercise an unnecessary inquiry. It is further unnecessary, because however favorable it may be to capitalists, it is subjugation even to manufacturers, and must impoverish a vast majority of the people in every state of the union to enrich a few, neither the necessity or advantage of which is suggested by the constitution.

It is easy to withhold future charters for establishing corporations to fleece agriculture and manufactures; it will be harder to repeal those already granted. Yet there is no point upon which the liberty of the nation more certainly depends,

than the subversion of the doctrine of a judicial power, to turn laws into contracts, and render them irrevocable, under a line of the constitution, which uses the identical words "law and contract" in different senses. To try this doctrine, by which charters, once the vehicles of liberty, are ingeniously converted into vehicles of slavery, I wish that congress would grant to a corporation of capitalists the exclusive privilege of furnishing the country with manufactures for one thousand years, with a stipulation for protecting duties, equal to an exclusion, for the same term. It would bring this momentous question to a fair decision whilst we have power to consider it.

The last, though not the least, political oppression upon agriculture, which I have selected, for this short consideration of its political state, is our treasury system, copied from the English, and of course liable to the same abuses. It is so utterly destitute of any security for the honest application of public money, that no congress, committee of congress, or member of congress, has ever examined the accounts of a single year, or been able to form a conjecture on the subject. The detail of checks is a detail of dependence and subserviency, and a tissue of ineffectual formality. The money passes in gross sums into the hands of a host of sub-treasurers. The system fell at once into the grossest of those corruptions which contaminate the British policy, that of losing sight of money after its appropriation, and considering it as constitutionally gone, however small a proportion of its object was obtained: so that an army upon paper, costs the same sum as an army in the field. This subject is however too long and intricate to follow away from that I am pursuing. This abuse in both countries endeavors to shrink from public view, behind screens called sinking funds, for applying a surplus of revenue to the payment of debt. These screens cover pecuniary abuses against those annual critical examinations of the items of public expenditure, so wholesomely practiced by state legislatures. Such annual examinations by congress would probably leave with agriculture a considerable amount of capital annually taken from her, to enrich knaves; for no other description of men can get a shilling from the omission of an annual examination of the public accounts. From the loan of money in Holland to put the United States' bank in motion, to this day, every minority has testified to great pecuniary abuses; and none, when converted into a majority, has ever provided a remedy against them.

The only remedy in this case, as in others, is to elect into congress a genuine agricultural interest, uncorrupted by a mixture with stock-jobbing, by a view of office, or by odious personal vices, and combined with good talents.

The political causes which oppress agriculture have been considered, before the domestic habits which vitiate it, to guard against the error of an opinion, that the latter may be removed, whilst the former continue. So long as the laws make it more profitable to invest capital in speculations without labor, than in agriculture with labor; and so long as the liberty of pursuing one's own interest exists; the two strongest human propensities, a love of wealth, and a love of ease, will render it impossible. The reason why agriculture is better managed in Europe than in the United States, is, the coercion of necessity upon the labo-

ers to improve it to the utmost. The landed interest there and here, as was before observed, entirely differ. The tenants or agriculturists are a species of slaves, goaded into ingenuity, labor and economy, without possessing any political importance, or the least share in the government. They are lashed into a good system of agriculture in the same way that good discipline is produced in an army; and this good system of agriculture is also for the benefit of their landlords and legislators, just as the good discipline of an army is for the benefit of its generals and other officers. It is more out of the power of English tenants or agriculturists, to become landlords, capitalists or manufacturers, or to escape the coercion which forces them to stretch the mind and the muscles after improvement, than of soldiers to desert. However they may move from place to place, like horses transferred from owner to owner, they are doomed to the same fate. Oppression, which causes agricultural improvement in England, will prevent it in the United States, because it cannot seize and hold fast the agriculturist. There, he can only soften oppression by superior skill and industry. Here, he can flee from it into a wilderness, or into a charter, and gain greater profit with less labor. We copy the English frauds upon the agriculturists, forgetting that the English power over him does not exist here. That instead of being able to lash him into excellence for the benefit of others, we can only solicit him by his own interest and happiness; and that this solicitation is an insult upon his understanding, if it honestly tells him, that government will establish the policy of scattering bounties at his expense, and of bestowing more profit and ease upon paper capital or fraudulent credit, than he can derive from solid land and honest labor. Being free, if he is wise, he will prefer a share of profit and ease, to a share of loss and toil. The cunning declaimers in praise of those who choose the yoke of evils, for the sake of getting the yoke of blessings for themselves, only deceive fools, so that wisdom as well as wealth is flying from the agricultural interest, and taking up her residence with the policy of making capital employed under charters, in credit shops and in manufacturing, more profitable than capital employed in agriculture. This union of wisdom and wealth, will in time reduce agriculture to the European regimen, and the agriculturists to the grade of tenants to a system for fostering dealers in money and credit, at the expense of the makers of bread, meat and cloth. This system, however slowly, certainly creates a class of rich and wise, and a class of poor and ignorant, and terminates of course in some European form of government.

I have heard it said that the weight of talents in congress has already appeared very visibly against the agriculturists. Let us not deceive ourselves by ascribing this to popular folly in elections. It is owing to the transit of wealth, and of course wisdom, from agriculture to its natural enemies, charter and privilege. This constant process diminishes daily the chance for elections to hit on agricultural talents, and will soon destroy the power to obtain them. If the fact exists as to a deficiency of these talents in congress, it proves the existence of a moral system which begets that fact, and discloses the inevitable fate of the agricultural interest.

To the force of this baleful system, as well as to the brevity proper for an essayist, some of the defects sprinkled throughout the view I have taken of the political state of agriculture, ought in justice to be ascribed; and if it fails to excite the agriculturists in and out of congress to look into their situation, it will only prove that the system has already had its effect on the author or his readers. Chartered knowledge is kept alive by its associations, and chartered interests advanced by frequent and mature consultations. An imitation of this example is the only mode of reviving agricultural knowledge, and of obtaining justice for agricultural interest. And if the suggestion of establishing agricultural societies in each congressional district, for the purpose of considering and explaining respectfully to congress, what does it good, and what does it harm, in imitation of other interests, should be adopted by agriculture, it may at least acquire the capacity of distinguishing between good and evil. (Note A.)

SLAVERY.

Negro slavery is a misfortune to agriculture, incapable of removal and only within the reach of palliation. The state legislatures, hopeless of removing all its inconveniences, have been led by their despair to suffer all; and among them, one of a magnitude sufficient to affect deeply the prosperity of agriculture, and threaten awfully the safety of the country; I allude to the policy of introducing by law into society, a race, or nation of people between the masters and slaves, having rights extremely different from either, called free negroes and mulattoes. It is not my intention to consider the peril to which this policy exposes the safety of the country, by the excitement to insurrection, with which it perpetually goads the slaves, the channels for communication it affords, and the reservoir for recruits it provides. I shall only observe, that it was this very policy, which first doomed the whites, and then the mulattoes themselves, to the fate suffered by both in Saint Domingo; and which contributes greatly to an apprehension so often exhibited. Being defined by experience in that country, and by expectation in this, it is unnecessary for me to consider the political consequences of this policy.

My present object is to notice its influence on agriculture. This so entirely depends on slaves in a great proportion of the union, that it must be deeply affected by whatever shall indispose them to labor, render them intractable, or entice them into a multitude of crimes and irregularities. A free negro and mulatto class is exactly calculated to effect all these ends. They live upon agriculture as agents or brokers for disposing of stolen products, and diminish its capital, both to the extent of these stolen products, and also to the amount of the labor lost in carrying on the trade.

They wound agriculture in the two modes of being an unproductive class living upon it, like a stock-jobber or capitalist class, and of diminishing the utility of the slaves. This latter mode might be extended to a multitude of particulars, among which, rendering the slaves less happy, compelling masters to use more strictness, disgusting them with agriculture itself, and greatly diminishing

their ability to increase the comforts, and of course the utility of slaves, would be items deeply trenching upon its prosperity. It is however unnecessary to prove what every agriculturist in the slave states experimentally knows, namely, that his operations are greatly embarrassed, and his efforts retarded, by circumstances having the class of free negroes for their cause.

The only remedy is to get rid of it. This measure ought to be settled by considerations of a practical moral nature, and not by a moral hypothesis, resembling several mechanical inventions incarcerated at Washington, beautiful and ingenious, but useless. It is substantial, not balloon morality, by which the questions ought to be considered; whether a severance of the free negro class from the whites and slaves, will benefit or injure either of the three classes; or whether it will benefit or injure a majority of them as constituting one body? The situation of the free negro class is exactly calculated to force it into every species of vice. Cut off from most of the rights of citizens, and from all the allowances of slaves, it is driven into every species of crime for subsistence; and destined to a life of idleness, anxiety and guilt. The slaves more widely share in its guilt, than its fraudulent acquisitions. They owe to it the perpetual pain of repining at their own condition by having an object of comparison before their eyes, magnified by its idleness and thefts with impunity, into a temptation the most alluring to slaves; and will eventually owe to it the consequences of their insurrections. The whites will reap also a harvest of consequences from the free negro class, and throughout all their degrees of rank suffer much in their morals from the two kinds of intercourse maintained with it. If vice is misery, this middle class is undoubtedly placed in a state of misery itself, and contributes greatly to that of the other two. The interest of virtue, therefore, as well as sound policy, is allied with the interest of agriculture, in recommending the proposed severance. If it should not benefit every individual of the three classes, as is probable, no doubt can exist of its benefiting a majority of each, and a very great majority of the whole. No injury, but much good to the whites and slaves is perceivable in the measure. And relief from the disadvantages of inferior rights, from the necessity of living in a settled course of vice, and from the dangers portended to it by a commotion among the slaves, promises great benefits to the free negro class itself from a severance.

It may be easily effected by purchasing of congress lands sufficient for their subsistence in states where slavery is not allowed, and giving them the option of removing to those lands, or emigrating wherever they please. Perhaps both the national safety and prosperity would justify a harsher measure. To advance both by bestowing rewards, cannot be severe, unjust or illiberal.

At least it will be admitted by those acquainted with the subject, that the prosperity of agriculture is considerably influenced by the circumstances alluded to in this number.

Societies are instituted to control and diminish the imperfections of human nature, because without them it generates ignorance, savageness and depravity of manners. Those best constituted, cannot however cure it of a disposition to command, and to live by the labor of others; it is

eternally forming sub-societies for acquiring power and wealth, and to these perfidious, ambitious, avaricious or unconstitutional sub-societies, the liberty and property of the rest of the body politic have universally fallen a prey. They are of a civil or military complexion, or of both, as the circumstances of the case may require fraud or force. Anciently, the general ignorance of mankind, caused the frauds of superstition to suffice for working the ends of traitorous sub-societies. As these became exploded, the more intricate pecuniary frauds were resorted to. Now, on account of the increasing knowledge and more prying temper of mankind, military force is united with pecuniary frauds. And hitherto the most perfect society for the public good, has never been able to defend itself against sub-societies in some form for advancing the wealth or power of a faction or a particular interest. Combine with this universal experience, that it is impossible to conceive a form of society better calculated to excite and foster factions or sub-societies, than one constituted of distinct colors, incurable prejudices, and inimical interests, and the inferences are unavoidable. If the badges of foolish names can drive men into phrenzy without cause, will not those which powerfully assail both reason and the senses, create deadly factions.

The attempt will undoubtedly terminate according to the nature of man, as it has once already terminated; but its catastrophe ought rather to be courted than avoided, if the author of the 'Notes on Virginia' is right in the following quotations. "The whole commerce between master and slave," says he, "is a perpetual exercise of the most boisterous passions, the most unremitting despotism on one part, and degrading submissions on the other. The parent storms, the child looks on, catches the lineaments of wrath, puts on the same airs in the circle of smaller slaves, gives a loose to his worst of passions, and thus nursed, educated and daily exercised in tyranny, cannot but be stamped by it with odious peculiarities. The man must be a prodigy who can retain his manners and morals undepraved by such circumstances. The Almighty has no attribute which can take side with us in such a contest." Such is the picture exhibited in the 'Notes on Virginia' of "the manners" of the people, without a single palliating circumstance; and Winterbotham in his 'History of America' has quoted and varnished it anew.

No man has been less accustomed than the author of the 'Notes on Virginia' to paint his opinions, for the same reason that an Indian paints his body; and yet from reading the whole chapter on the manners of that state, a stranger would hardly form a more correct idea of them, than a stranger to Indians would of their color, on seeing one painted coal black. Circumstances affect the mind, as weather does beer, and frequently produce a sort of moral fermentation, which throws up bubbles of prismatic splendor, whilst they are played upon by the rays of some temporary effervescence, but destined to burst when the fermentation ceases. The 'Notes on Virginia' were written in the heat of a war for liberty; the human mind was made still hotter by the French revolution; and let those who were insensible of the mental fermentations and moral bubbles generated by these causes, censure Mr. Jefferson. I should be unjust to do it.

If Mr. Jefferson's assertions are correct, it is

better to run the risk of national extinction, by liberating and fighting the blacks, than to live abhorred of God, and consequently hated of man. If they are erroneous, they ought not to be admitted as arguments for the emancipating policy. The considerations, which this chapter of impassioned censure of slave-holders inspires, are too extensive for a hasty essay, but a few of them may be noticed. I shall pass over the enlistment of the Deity in the question, with a humble hope, that his justice and mercy do not require the whites and blacks to be placed in such a relative situation, as that one color must extinguish the other; and as inclining to think the enrolment of his name on the side of the slaves, somewhat like a charge of inattention to his own attributes, apparently siding with masters throughout all ages and among most nations hitherto, the liberating St. Domingo masters excepted; and not a little tinged with impiety. Slavery was carried farther among the Greeks and Romans than among ourselves, and yet these two nations produced more great and good patriots and citizens, than, probably, all the rest of the world. In the United States it is also probable that the public and private character of individuals is as good, as in the countries where locomotive liberty and slavery to a faction exist; nor do the slave states seem less productive of characters in whom the nation is willing to confide than the others. Even the author of the quotation himself may be fairly adduced as an instance which refutes every syllable of his chapter on Virginia manners, unless indeed this refutation, and an abundance of others like it, can be evaded by forming the best citizens into a class of prodigies or monsters, to evade the force of eminent virtues towards the refutation of erroneous assertions.

These facts are referred to the consideration of the physiologist. To me it seems, that slaves are too far below, and too much in the power of the master, to inspire furious passion; that such are nearly as rare and disgraceful towards slaves as towards horses; that slaves are more frequently the objects of benevolence than of rage; that children from their nature are inclined to soothe, and hardly ever suffered to tyrannize over them; that they open instead of shutting the sluices of benevolence in tender minds; and that fewer good public or private characters have been raised in countries enslaved by some faction or particular interest, than in those where personal slavery existed.

I conjecture the cause of this to be, that vicious and mean qualities become despicable in the eyes of freemen from their association with the character of slaves. Character, like condition is contracted, and as one contrast causes us to love liberty better, so the other causes us to love virtue better. Qualities odious in themselves, become more contemptible, when united with the most degraded class of men, than when seen in our equals; and pride steps in to aid the struggles of virtue. Instead, therefore, of fearing that children should imbibe the qualities of slaves, it is probable, that the circumstance of seeing bad qualities in slaves will contribute to their virtue.

For the same reason the submission and flattery of slaves will be despised, and cause us rather to hate servility than to imbibe a dictatorial arrogance; and only inspire the same passion with the

submission and flattery of a spaniel. It is the submission and flattery of equals, which fills men with the impudent and wicked wish to dictate, and an impatience of free opinion and fair discussion. This reprehensible temper is a sound objection against any species of human policy, which generates it, and applies most forcibly against that conferring on an individual a power, so to dispense money and honors, as to procure submission and flattery from the highest ranks and conditions in society, a thousand times more genial to pride, than the submission and flattery of a poor slave; and ten thousand times more pernicious to nations.

Virtue and vice are naturally and unavoidably co-existent in the moral world, as beauty and deformity are in the animal; one is the only mirror in which the other can be seen, and therefore in the present state of man, one cannot be destroyed without the other. It may be thus that personal slavery has constantly reflected the strongest rays of civil liberty and patriotism. Perhaps it is suffered by the Deity to perform an office without which these rays are gradually obscured and finally obliterated by characters and partial laws. Perhaps the sight of slavery and its vices may inspire the mind with an affection for liberty and virtue, just as the climates and deserts of Arabia, would make it think Italy a paradise.

Let it not be supposed that I approve of slavery, because I do not aggravate its evils, or prefer a policy which must terminate in a war of extermination. The chapter on the manners of slaveholders before quoted, concludes with an intimation, that the consent of the masters to a general emancipation, or their own extirpation, were the alternatives between which they had to choose. Such a hint from a profound mind is awful. It admits an ability in the blacks, though shackled by slavery, to extirpate the whites, and proposes to increase this ability by knocking off their shackles. Such a hint adds force to the recommendation in the previous essay for separating the enslaved and free blacks, as some security against the prognosticated extirpation. And after such a hint, "with what execration should the statesman be loaded" who thus forewarned, should produce the destruction of the most civilized portion of society, and repeople half the world with savages. If England and America would erect and foster a settlement of free negroes in some fertile part of Africa, it would soon subsist by its own energies. Slavery might then be gradually re-exported, and philanthropy gratified by a slow reanimation of the virtue, religion and liberty of the negroes, instead of being again afflicted with the effects of her own rash attempts suddenly to change human nature. (Note B.)

OVERSEERS.

So far from having a system of agriculture among us, very few have even taken the trouble to discover or provide any basis for one. Had Archimedes proposed to move the earth without any thing for himself or his mechanism to stand on, or an architect to erect a city without a foundation, such projects would have been equivalent to ours for erecting a system of agriculture upon

the basis of the impoverishment of the land. Of what avail is any rotation of crops, the best contrived implements of husbandry, or the most perfect use of those implements, applied to a barren soil? Could a physician correctly call the regular administration of a slow poison a system of medicine, because he used the best constructed lancets, caudle cups, syringes and glyster pipes in killing his patient?

It is absurd to talk of a system of agriculture, without having discovered, that every such system, good for any thing, must be bottomed upon fertility. Before, therefore, we launch into any system, we must learn how to enrich our lands. The soil of the United States upon the Atlantic Ocean is naturally thin, and exceedingly impoverished. It produces, however, good crops, when made rich, almost under any species of cultivation. To make it rich therefore ought to be the first object of our efforts, as without effecting this, all other agricultural objects, beneficial to ourselves or our country, must fail. Instead of this, for one acre enriched, at least twenty are impoverished.

The disposition of our soil and climate to reward husbandry bountifully, is disclosed in the great returns bestowed upon bad culture, by the very moderate degree of natural fertility, possessed by the former. The climate is beyond our power, but the productiveness of the soil without the help of art, is an encouragement for us to recollect how impiously we have neglected the cultivation of a deity so propitious. But this deity has a rival demon, called ignorance, for whose worship the slave states have erected an established church, with a ministry, entitled overseers, fed, clothed and paid to suppress every effort for introducing the worship of its divine adversary. This necessary class of men are bribed by agriculturists, not to improve, but to impoverish their land, by a share of the crop for one year; an ingenious contrivance for placing the lands in these states under an annual rack rent, and a removing tenant. The farm, from several gradations to an unlimited extent, is surrendered to the transient overseer, whose salary is increased in proportion as he can impoverish the land. The greatest annual crop, and not the most judicious culture, advances his interest and establishes his character; and the fees of these land doctors are much higher for killing than for curing. It is common for an industrious overseer, after a few years, to quit a farm on account of the barrenness, occasioned by his own industry; and frequent changes of these itinerant managers of agriculture, each striving to extract the remnant of fertility left by his predecessor, combine with our agricultural ignorance, to form the completest system of impoverishment, of which any other country can boast.

I mean not to speak disrespectfully of overseers; they are as good as other people; nor is it their fault if their employers have made their wealth and subsistence to depend on the impoverishment of half a continent. The most which the land can yield, and seldom or never improvement with a view to future profit, is a point of common consent and mutual need between the agriculturist and his overseer; and they generally unite in emptying the cup of fertility to the dregs.

It is discovered in England from experience, that short leases were the worst enemies to agriculture. Those of twenty-one years are found by

experience to be too short for improvement. Must the practice of hiring a man for one year by a share of the crop, to lay out all his skill and industry in killing land, and as little as possible in improving it, suggested by the circumstances and necessities of settling a wilderness among hostile savages, be kept up to commemorate the pious learning of man to his primitive state of ignorance and barbarity?

Unless this custom is abolished, the attempt to fertilize our lands is needless. Under the frequent emigrations of owners from state to state, and overseers from plantation to plantation, it cannot be accomplished. Impoverishment will proceed, distress will follow, and famine will close the scene. It is a custom which injures both employers and overseers, by gradually diminishing the income of the one, and of course the wages of the other. Wages in money would, on the contrary, correspond with a system of gradual improvement, by which the condition of both parties would be annually bettered, and skill in improving, not a murderous industry in destroying land, would soon become a recommendation to business, and a thermometer of compensation.

INCLOSING.

The modes of fertilizing land form a system, wholly unfit, as we shall see upon enumerating a few of its constituents, to be enforced by an itinerant order, bribed to counteract most or all of them. The most effectual is found, when we have found the most copious fund of manure. Manures are mineral, vegetable or atmospherical. Perhaps the two last may be resolvable into one. Mineral manures are local and hard of access. But the earth swims in atmosphere and inhales its refreshments. The vegetable world covers the earth, and is the visible agent, to which its surface is indebted for fertility. If the vast ocean of atmosphere is the treasury of vegetable food, vegetable manure is obviously inexhaustible. The vegetable world takes its stand upon our earth to extract the riches of this treasury, larger than the earth itself, and to elaborate them into a proper form for fertilizing its surface. The experiment of the willow, planted a slip, in a box containing 200 pounds of earth, and at the end of a few years, exhibiting a tree of 200 pounds weight, without having diminished the earth in which it grew, demonstrates the power of the vegetable world to extract and to elaborate the atmospherical manure. This 200 pound weight of willow, was a prodigious donation of manure, by the atmosphere, to the 200 pounds weight of earth in which it grew. It was so much atmosphere condensed by the vegetable process, into a form capable of being received and held by the earth, and of being reduced to vegetable food, during its struggles to return to its own principle, through the passes of putridity and evaporation. Vegetables, like animals, feed on each other. Inclosing for the sake of rearing vegetables to enrich the earth, is the mode by which the greatest quantity of atmospherical manure can be infused into it with the least labor. It is prepared and spread without expense. Cross fences, those drawbacks of man's folly from divine benevolence, are saved by inclosing to fertilize;

and if the laws for confining land under inclosures, for permitting animals to prowl at large, and for punishing landholders for the trespasses committed by these marauders on their land, were made more conformable to justice, common sense and common interest, the supplies of manure from the vegetable world, would become combined with a vast diminution of labor. Thus the two primary objects of agriculture, (to fertilize the land, and save labor) would be both attained to a measureless extent. Vegetables would collect from the atmosphere, an inexhaustible supply of manure, and spread it on land; fencing and timber to great extent would be saved, and agriculture would soon aspire to her most elegant ornament and useful improvement, live fences.

But alas! we persist in the opinion, that lands trespass on cattle, and not cattle on land. Out of emulation I suppose of an ancient doctrine, which the bayonet only could confute, that it was better to fasten the plough to the tail than the shoulder.

It is yet a question, whether the earth is enriched by any species of manure, except the vegetable or atmospherical, and experiments have hitherto leaned towards the negative. Without new accessions of vegetable matter, successive heavy dressings with lime, gypsum and even marl, have been frequently found to terminate in impoverishment. Hence it is inferred, that minerals operate as an excitement only to the manure furnished by the atmosphere. From this fact results the impossibility of renovating an exhausted soil, by resorting to fossils, which will expel the poor remnant of life; and indeed it is hardly probable that divine wisdom has lodged in the bowels of the earth, the manure necessary for its surface.

However this question may be determined, the impossibility of obtaining mineral manure in quantities sufficient to enrich an impoverished country leaves us no alternative; whilst the spasmodic efforts it excites in the agony of death, are better calculated to accelerate the evil, and to aggravate national distress by inspiring false hopes, than to remedy the impoverishment of excessive culture.

If vegetable matter is either the only manure, or the only attainable manure, capable of renovating our country, let us cast our eyes upon its surface, and discover the demand, by computing the impoverishment. We want as much as we have expelled, to get back to the state from which we set out. We must retrieve, before we can improve. The nation never dies; it is the yoke fellow of the earth; these associates must thrive or starve together; if the nation pursues a system of lessening the food of the earth, the earth in justice or revenge will starve the nation. The inclosing system provides the most food for the earth, and of course enables the earth to supply most food to man. It is time working on space.

Let us boldly face the fact. Our country is nearly ruined. We have certainly drawn out of the earth three fourths of the vegetable matter it contained, within reach of the plough. Vegetable matter is its only vehicle for conveying food to us. If we suck our mother to death we must die ourselves. Though she is reduced to a skeleton, let us not despair. She is indulgent, and if we return to the duties revealed by the consequences of their infraction, to be prescribed by God, and demonstrated by the same consequences to comport with our interest, she will yet yield us milk.

We must restore to the earth its vegetable matter, before it can restore to us its bountiful crops. In three or four years, as well as I remember, the willow drew from the atmosphere, and bestowed two hundred weight of vegetable matter, on two hundred weight of earth, exclusive of the leaves it had shed each year. Had it been cut up and used as a manure, how vastly would it have enriched the two hundred weight of earth it grew on? The fact demonstrates that by the use of vegetables, we may collect manure from the atmosphere, with a rapidity, and in an abundance, far exceeding that of which we have robbed the earth. And it is a fact of high encouragement; for though it would be our interest, and conducive to our happiness, to retrace our steps, should it even take us two hundred years to recover the state of fertility found here by the first emigrants from Europe; and though religion and patriotism both plead for it, yet there might be found some minds weak or wicked enough, to prefer the murder of the little life left in our lauds, to a slow process of resuscitation.

Forbear, oh, forbear matricide, not for futurity, not for God's sake, but for your own sake. The labor necessary to kill the remnant of life in your lands, will suffice to revive them. Employed to kill, it produces want and misery to yourself. Employed to revive, it gives you plenty and happiness. It is matter of regret to be compelled to rob the liberal mind of the sublime pleasure, bestowed by a consciousness of having done its utmost for future ages, by demonstrating that the most sordid will do the utmost for gratifying its own appetites, by fertilizing the earth; that the process is not slow, but rapid; the returns not distant, but near; and the gain not small, but great.

Inclosing is a single channel for drawing manure from the atmosphere and bestowing it on the earth. Though it is the great canal, there are a multitude of feeders. These are not lost in admiration of the most powerful mode for fertilizing the earth, and will be subsequently remembered.

At present it is necessary to consider the best mode of practising the inclosing theory. It is one which can only succeed in combination with a great number of agricultural practices, at enmity with those which at present prevail.

It is at enmity with the practice of summer fallowing for wheat. Being founded in the doctrine, that vegetables extract the principles of fertility from the atmosphere, and elaborate them into a manure for the earth, it is inconsistent with the doctrine that the earth will be improved by keeping it bare. If vegetables do not feed upon, and consume earth, but upon the atmospherical manure, which may have been introduced into, or is floating around it, then a naked fallow by increasing evaporation, will impoverish the earth, and waste at each ploughing a portion of this fleeting fertility, without its being arrested by a crop.

It accords with the doctrine of turning in a clover lay, or a bed of any other vegetable matter, for a crop speedily sown or planted thereon, without disturbing this new bed of vegetables, by which the previous stock of atmospherical manure in the earth is vastly increased, and the least loss by evaporation sustained.

It is at enmity with shallow ploughing, because it admits atmospherical manure into the earth by water and air, to a less depth, and loses it sooner

by evaporation, and the more rapid escape of water from its fluidity.

It accords with deep ploughing, because it enables the earth to absorb more atmospherical manure through the two great vehicles, air and water; and because it buries deeper the manure deposited on the earth in a vegetable form; in one case inhaling more, and in both exhaling less.

It is at enmity with the custom of exposing a flat surface to the sun, and accords with an opposite one; because by the first the force of its rays in promoting evaporation is increased, and by the second diminished. These cases are selected to suggest to the reader, that the theory of fertilizing the earth by atmospherical or vegetable manure, is one, which, if correct, will reach and influence nearly the whole circle of our agricultural modes of managing the earth.

If plants feed on earth, why do they perish by drought? If they did not feed on atmospherical manure, why do they instantly revive from rain? And why do we see them considerably revived even without rain, when the air becomes condensed, after having been greatly rarified if the food it affords them was not too thin in one case, and more substantial in the other?

Drought becomes far less pernicious to crops, in proportion to the stock of atmospherical manure with which the earth has been stored to meet it and the obstacles opposed to its loss.

To avoid a frequent reference to experience as a voucher for the doctrines advanced in these essays I shall once for all observe, that they are always drawn from that source, except when the contrary is expressed. But it would be tiresome to the reader to wade through a list of experiments made with more industry than scientific skill, for a long course of time, and suggested, not by a love of fame, but by necessity. Besides we must acquire principles before we descend to details.

Let us return to the case of drought. Its effects are greatly diminished by burying with the plough a copious supply of vegetable matter, and by opposing an uneven surface to evaporation. It is because this vegetable matter or atmospherical manure, elaborated into a solid form, is the food of plants; and this food is retained longer by deep ploughing and an uneven surface, than by shallow ploughing and a level surface. And if these latter practices are not combined with a good stock of vegetable food, the effects of drought appear sooner, and are more fatal.

The sudden benefit of rain to plants demonstrates that it is loaded with their food; and its transitory effect equally demonstrates that this food rapidly evaporates. There is no manure the effects of which are more sudden or less permanent. As they disappear from drought, the loss must be attributed to evaporation. Checks upon evaporation are of course auxiliaries to the inclosing system.

The shade to the earth is a check it naturally produces, and a consequence of this check is, that the atmospherical manure carried by air or rain into the earth, being longer retained, is imbibed in greater quantity by the vegetable cover, and elaborated into a manure more permanent than when deposited in these vehicles.

Wood, and all the vegetables of softer texture, are exposed to the effects of putrefaction and

evaporation, in a degree so far below water, that a complete dressing of atmospherical manure, conveyed in the vegetable vehicle, will discover its benefit for years, whilst one conveyed in rain will disappear in a few weeks. It follows that the nearer the vegetable vehicle of manure from the atmosphere, approaches to wood, the longer it will last, and that the nearer it approaches to water, the shorter it will last.

If this principle is sound, a point of great importance to the inclosing system is settled; whether it is better to plough in vegetables in a succulent or a dry state? Every experiment I have ever made, decides in favor of the latter, and these decisions correspond with the requisitions of our theory. By ploughing in the vegetables succulent, we stop the process for extracting, elaborating and condensing atmospherical manure, and chiefly bury water, liable to the laws of evaporation, demonstrated in the case of rain, the richest but the most short lived of every species of manure. The rapidity with which the water of vegetables in a succulent state evaporates, is demonstrated in curing grass for hay; and the loss is probably greater when the vegetable is never reduced at all to a dry and hard state. On the contrary, by suffering the vegetable to acquire its most solid form, it will extract more manure from the atmosphere, and this manure will be retained vastly longer by the earth; so long indeed, that a good farmer will accumulate fresh supplies upon a remaining stock from time to time, so as to replenish his land at a compound ratio. And by suffering the vegetable cover, whatever it is, to gain its hardest form, it affords longer shade to the surface of the earth, whilst it is also making daily extracts from the atmosphere, during its whole succulent existence, to be deposited within its bowels.

To draw from the atmosphere the greatest quantity of manure, to check the loss the earth sustains from evaporation during the process by shade, to give the manure the most lasting form, and to deposit it in the most beneficial manner, are primary objects of the inclosing system.

The best agent known to us for effecting the three first, is the red clover. Its growth is rapid; its quantity exceeds the product of any other grass; it throws up a succession of stems in the same summer; and these stems are more solid and lasting than those of other grasses. These successive growths constitute so many distinct drafts from the great treasure of atmospherical manure in one year. Whilst these drafts are repeated, the clover is daily securing the treasure in a form able long to elude the robber evaporation, whom it also opposes by shade. To its extracting from the atmosphere the greatest quantity of manure, and elaborating it into a lasting form the most suddenly of any other vegetable cover, clover lays for wheat are indebted for their fame. Their success has been attributed to the portion of the vegetable in a succulent state, whilst it was owing to the greater portion which had arrived to maturity previous to the fallow. To ascertain this fact, let one moiety of a clover field be turned in as soon as its first crop flowers, and the other after the stem of the last crop is hard, and the whole sown on one day in wheat.

The peculiar propensity of clover to be improved by a top dressing of the gypsum, is another

striking circumstance of its affinity to the system for fertilizing land by its own cover. As its growth is suddenly and vastly increased by this top dressing, it furnishes reason to believe, that the effect flows from a disposition communicated by the gypsum to the clover, for imbibing atmospherical food by its external parts; and so much as it thus gains, affords to the earth a double benefit. One, that this food not being extracted from the stock of atmospherical manure, possessed by the earth, does not impoverish it; the other, that being bestowed on the earth from whence it was not taken, it adds to its fertility.

The tap root of the clover also advances the intention of the inclosing system in several respects. By piercing the earth to a considerable depth, apertures or pores are created for imbibing and sinking deeper a greater quantity of atmospherical manure; so well defended by the shade of the top; and the friability thus communicated to the soil, affords a most happy facility to the plough, for turning in its vast bed of vegetable matter.

In commemorating the value of clover as an agent for transferring a portion of the inexhaustible wealth of the atmosphere to the earth, we must not forget that every member of the vegetable world, contributes to the same purpose; and that these auxiliaries to clover will powerfully second its efforts, and may be successfully substituted for it, where circumstances deny its use. In the exhausted lands, sandy soil and dry climate of the country below the mountains, clover will not live. Recourse must therefore be had to other means of improving the land to endow it, with a capacity of resorting to its use. It is eminently endowed with this capacity by a certain degree of fertility, and thenceforth good management will retain and increase it.

In the mean time, the best substitute for clover should be sought for by experience. The bird foot clover, as it is called, is one of considerable promise; it will flourish in a sandy soil, is equally improved by the gypsum, affords early and good shade, makes a multitude of seed, and may by a small degree of skill, be kept up without being sown. Though it perishes early in the summer, it yet leaves a great cover of dry vegetable matter on the earth, which defies evaporation, until the plough can turn it in. And its dead coat is frequently pierced by other grasses, and sometimes by luxuriant growths of weeds, before unknown to the soil, which seem to come forward as witnesses to the fact of its fertilizing the land. This grass is an enemy to wheat on account of its early and rapid growth, and of course ought only to be used to fertilize land in which wheat ought not to be sown. And as wheat cannot be beneficially sown in land, unable to produce red clover, the bird foot clover seems designed to take up the care of the soil, at the point of impoverishment, where the red lays it down. As red clover is the best associate of wheat, for the purpose of saving and improving a good soil, bird foot is the best associate of Indian corn, for rendering the same services to a bad one.

Individuals of the vegetable world are quoted, not to insinuate that their powers for the object proposed are extremely peculiar, but to illustrate my hypothesis. The entire vegetable creation must contribute towards sustaining this hypothesis, or it must fall. If it is supported by this spacious

foundation, there are few systems better supported. Therefore, after having deduced the benefit resulting to land by inclosing, from the hypothesis that vegetables draw, retain, and bestow on the earth the atmospherical manure in great abundance, I shall proceed to consider other modes of manuring it, chiefly founded in the same hypothesis.

MANURING.

It is not my design to advance any thing strange or new, or to recommend expensive, difficult, or uncommon modes of improving land. Brilliant projects for improvement, in the present state of agriculture, would be like diamonds set in lead. My utmost design is to point out a few improvements which even ignorance can understand, and poverty practise; yet such as may not be beneath the regard of knowledge, nor the interest of wealth.

The most abundant sources for artificial manure in the most exhausted district of our country, are the offal of Indian corn, the straw of small grain, and the dung of animals. We find in the two first, proofs of the value of dry vegetables as a manure. If these few means for fertilizing the country, were skillfully used, they would of themselves suffice to change its state from sterility to fruitfulness. But they are so egregiously neglected or mismanaged, that we hardly reap a tithe of their value.

There is no farinacious plant which furnishes so rich and so plentiful a crop as the Indian corn. It yields food in abundance for man, beast and land. By the litter of Indian corn, and of small grain, and by penning cattle, managed with only an inferior degree of skill, in union with inclosing, I will venture to affirm, that a farm may in ten years be made to double its produce, and in twenty to quadruple it; the ratio of its increased value is of course still greater.

There is no other secret in the business than that none of these manures be wasted. The agriculturist who expects to reap good crops from neglecting his manures, is equally a fanatic with the religionist, who expects heaven from neglecting his morals.

Details, however unentertaining, may not be useless; therefore I shall often resort to them. The stalks of corn should constitute the chief litter and part of the food, both of the stable and farm pen yard, during the winter. The sooner they are used after the corn is gathered, the more saccharum remains to bestow value on them as food, and the more manure they will yield, as evaporation diminishes both; and this proceeds far more rapidly whilst standing single, subject to the vicissitudes of weather, than when immersed in the steady moisture and cold climate of the farm yard. As a food, they are better for horses than for cattle, because of the superior masticating power of the former; whereas cattle are able to eat but little of the stalk itself, and chiefly confine themselves to picking an inferior food attached to it. Stalks carried morning and evening in loads, into the farm pen and stable yard, furnish both to cattle and horses much food, but to the latter, early in the winter, they are a species of fodder the most

beneficial I have ever tried; and besides the manure they furnish, will amply recompense the farmer, by enabling him to spare his hay and corn blades, to be used when the labor of his team becomes harder. They enable him also to relieve his land from the tax of pasturing horses, by the preservation of hay and blades for the summer's use, and are in that way eminently subservient to the inclosing system.

To the stalks are to be added the blades, tops, sheaves and cobs of the Indian corn, all in some degree a food, and a plentiful litter. The value of the cob as a food is highly spoken of, but has not been ascertained by me; as a manure, by depositing them in deep furrows two or three feet apart, barely covering them with a plough, and bringing the land two years afterwards into till, I have found them excellent. In every view they illustrate the vegetable power of elaborating atmosphere into hard and enriching substances.

The great object in making and applying the manure arising from litter of every kind, and the dung of animals, is to avoid the loss by evaporation. In obedience to the old English authorities, I have in various ways compounded dunghills, kept them through the summer, and covered with earth and with bushes, the manure of the farm pen; and the loss has been regularly graduated by the fermentation produced, from a moiety to three fourths, being invariably greater, the better the litter was rotted, or the greater the degree of fermentation. As a farther experiment to ascertain the same fact, I have several times penned the same cattle on the same space for the same period, ploughing up one portion as soon as the pen was removed, and leaving the other unploughed for eight or ten weeks. On putting both at one time in the same crop, the result has uniformly been, a vast inferiority to a line, of that left exposed to the effects of evaporation.

An effervescence which shall become so intense, as to produce a visible evaporation or smoke, is said to be an effect of ploughing in a cover of green vegetables, and this effect is stated as an argument of fertilizing consequences to the earth. If an escaping torrent of manure is calculated to impart lasting fertility to the earth, then the hypothesis which considers evaporation as a channel for impoverishing, and not for fertilizing the earth, is an error. Then also the ancient English habit of making manure by contriving every means of promoting evaporation is correct, and the modern notion that this habit wastes manure by restoring it to the atmosphere, is incorrect. The heat of the sun will sometimes make wet earth smoke, but instead of enriching, it thereby extracts the manure contained in water. The evaporation of green vegetables in a perceptible smoke, must have a similar effect. The idea that this smoking of the earth was a proof that we were making a great quantity of manure of green vegetables, may have been borrowed from inferring the same thing from the smoke of dunghills compounded of dry; and whilst the latter opinion is exploded by the common instances of the vast loss of manure it produces in these dunghills, the former may have continued, though founded in the same principle, for want of familiar experiments to disprove it.

The system of husbandry for fertilizing the earth, by increasing its friability, for the sake of

enabling it more copiously to inhale the atmospherical manure, has the great defect of not providing against the effects of exhalation. Inhaled atmosphere being as rare and as light as inhaled water, is as liable to the laws of evaporation, and its benefit to the land must of course be as transient. Against this defect, the permanency of atmospherical manure, in the form of hardened vegetable, so much less exposed to these laws, provides.

To support the details of manuring, it is necessary to advert occasionally to principles. Tull's husbandry is the remedy recommended for the erroneous opinion, that ten cultivated acres will not produce the means of manuring above one. This error is founded on the inhaling, without considering the exhaling quality of the earth; and to supply the want of manure, we are advised to expose our lands to evaporation in the greatest possible degree, by naked fallows.

On the contrary, I am convinced, that if we will watch and arrest the thief evaporation, whether stealing our means for raising manure, or sweating the earth as a Jew sweats gold, we shall discover modes of fertilizing land infinitely beyond our most sanguine hopes, both by additions of manure, and obstructions to evaporation.

Twenty-five years ago, I found more difficulty in manuring one acre for five laborers, including women and boys, owing to a waste of my means for raising manure, and an ignorance of applying it, than I now do in manuring two acres for each. By manuring two acres for each laborer, with the three resources only common to every bread stuff farm, it follows that we may manure about one-seventh of the land we annually put in till, if, as I suppose, we can seldom plough more than fourteen acres for each laborer, including women and boys. This is at once attaining to the summit of European exertion, without the aid of lime, marl, soot, the sweepings of cities, and several other resources for improving land, which contribute greatly towards conducting European farmers to the same stage of improvement; and without the vast benefit of inclosing. Two reasons exist for an event apparently so unlikely; the Indian corn furnishes a fund of litter for raising manure, infinitely exceeding any of theirs, and their waste of manure by evaporation is avoided.

This subject compels me to revert to a use of Indian corn, before the mode of its culture is considered. Its blade makes the finest fodder, and if well saved furnishes but little litter, because it is all eaten. Being the best hay, it ought to be saved for the hottest and most laborious season of the year, which occurs immediately after the green clover fails. The first part of the Indian corn which should be used as food is the stalk, because it is harder to keep sound through the winter, than any other fodder, and its saccharum is continually wasting. The tops should be devoted to covering a farm pen of rails, in the form of three sides of a square, closed to the ground on the outside, and open within, and to a house for pumpkins and turnips stacked in the common form. Some loss will accrue from the evaporation of a cover, whether composed of straw or corn tops, and tops make infinitely the best. And some annual cover of a winter's farm-pen for cattle, is indispensable, as being a vast saving upon the European custom of stationary cow houses. Arthur Young is, I think,

of opinion, that 1200 acres is that size for a farm best adapted for the economy of labor. Suppose two hundred and fifty acres of this farm to be annually ploughed, and fifty to be annually manured: If this manuring is commenced around a station for raising manure, in four years the station is isolated in the midst of two hundred acres of manured land, leaving it about six hundred yards distant from the nearest of the manured land, which distance increases, as the manuring is extended, from that minimum, to its maximum, namely, the distance from the centre to the verge of an area of one thousand two hundred acres. Hence the expense of carrying in the litter, and carrying out the manure, will presently become so enormous, as to drive the farmer into the ancient ruinous and abandoned custom of infield and outfield, or that of highly improving a spot around his house, and highly impoverishing the rest of his farm.

An ambulatory cow house is the remedy for this disastrous mode of management. The sheep and cattle should be employed in manuring abroad, and the horses at home. The farm pens of the farmer should be placed in the field for cultivation, with an eye to convenience or saving of labor, both in receiving the stalks from the shift of the preceding year, and also in distributing the manure in that to be cultivated. It is far better to make a lane of great length to conduct the cattle to water, than to omit this management.

The greatest assiduity should be used in conveying the corn stalks to these farm pens, and the stable yard as early as possible, reserving the shucks, the straw, the tops, the blades, and the hay for later periods; because the injury to the stalks standing single and exposed to the vicissitude of weather, is infinitely greater from evaporation than to these other articles of food and litter. Some small quantities of straw and shucks should however be used with them, to produce compactness as a defence against evaporation, and to treat the cattle with a variety of food, so grateful to animals. The straw and the shucks after the stalks are all in, will bestow a cover on them, impenetrable to drought, and secure against evaporation; the several kinds of litter are beneficially mingled, and the tops which covered the cow house are the last food of its inhabitants.

The ground to be manured, should be fallowed in the winter, since the more friable its state, the better it commixes with the unrotted contents of the farm pens, and the better these contents are covered with the plough. If this is neglected, the want of a thorough commixture, and the exposure of manure on the surface, both of which will happen in a degree when the long litter of the farm pen is carried on unploughed ground, generally causes the loss of one-half of the manure, and one-half of the crop.

The winter's fallow to receive the spring manure, is a business capable of some improvement, and economy of labor. This fallow, when the manure is for Indian corn, as it ought to be where that grain is cultivated, should be made by three furrows, forming a ridge five feet and a half wide. Two of these furrows are made by a large plough, calculated to cut deep and wide, and to turn the sod completely over; and the third by a plough called a trowel-hoe, made one-third larger than usual, with a coulter on the point, and a mould board on each side. If the field has been left in

such ridges at its last cultivation, the large plough cuts a furrow on the ridge on each side of its summit, making the sod it turns up to meet thereon, and leaving under that sod all the earth it can cover, unbroken; these two furrows will leave the old water furrow between them, or an equivalent space, which the described trowel-hoe-plough, with its two large mould boards, will break up, throwing the sod on each side. Both these ploughs should be drawn by four horses, leaving the furrow made by the trowel-hoe uncommonly deep and wide. In this state the ground lies through the winter. Its vegetable cover is buried so as to escape some loss by evaporation, the unbroken space is so mellowed by the cover of the sod, as to become soft and friable by the spring, and the bottom of the large open furrow, commonly a dead clay, is invigorated by a winter's exposure to the atmosphere.

The manure ought to be devoted to Indian corn, because a crop of great value is thereby gained, whilst it is going through the process, supposed in England to be necessary to reduce it to vegetable food. Complete putrefaction is there considered as necessary, for this end. Whereas, by planting Indian corn, as soon as the unrotted manure of the farm-pen is carried out and ploughed in, its growth is greatly nourished and finally perfected, by the time the putrefaction is completed. It catches the evaporation produced by the moderate fermentation of the rotting vegetable matter of which the manure is compounded, and exactly that portion of manure which is lost, by the custom of rotting it before it is used, becomes the parent of a great crop. By the fall the manure is reduced to a fit pabulum for wheat, and even more of it is saved for this end, mingled in the earth, and subject to a moderate fermentation, than if it had been retained in hot dunghills through the summer, exposed to a violent effervescence, and then exclusively devoted to this crop upon a naked fallow. The area manured would not be at most above half the extent, and the degree of enrichment nearly the same.

Indian corn thrives better with unrotted manure, than any other crop, and is precisely the crop, and almost the solitary one, ready to associate with coarse litter, the first growing weather which occurs after it is applied. Potatoes and tobacco may possibly possess the same quality. The former certainly associates well with coarse manure, but neither are profitable as a crop; one is not adapted to the climate favorable to Indian corn, and the other is not admissible into any good system of agriculture.

Manure from the litter of a farm, ought to be chiefly made in the cool portion of the year, to avoid the enormous loss produced by a combination of heat, moisture and vegetable matter. If a considerable portion of this litter is reserved for the summer's use, a considerable loss is unavoidable. A small part of it only may be kept for the stable, more for the sake of the horses than for the object of manure. It is better for that object to exhaust the litter in the winter season, than to reverse any of it for summer, if the opinions that vegetables extract manure from the atmosphere, and that manures are gradually evaporated back to their origin, be true; because litter is exposed to a far greater loss from evaporation, by a commixture with moist dung in summer, than if it

had been spread on the farm-yards in winter, and ploughed into the earth in spring, before any considerable fermentation occurs. Hence, as the dung of animals constitutes but a small portion of the manure which ought to be raised on a well managed farm, it would be a loss to sacrifice a considerable mass of vegetable manure, for this object of inferior value. The American custom of penning cattle during the night in the summer season, properly attended to, is therefore a far more thrifty one, for the object of manuring, than the English custom of mingling moist dung and vegetable litter during that season. By ours, both these kinds of manure escape much of the loss from evaporation; by theirs, this loss is increased as to both, by an excessive effervescence.

Yet the dung of animals during the summer season is an item of great moment for enriching lands, if it is saved without subtracting from the more valuable item of the winter's farm yards. The most beneficial mode of its application within the scope of my observation is penning cattle and sheep, graduating the size of these pens by observation, until the designed quantity of manure shall be deposited within two weeks at most, and ploughing it in on the day the pen is removed invariably. The loss from evaporation is so great that a pen ought never to remain above two weeks. I have frequently seen cow pens continued in one spot, until the daily loss balanced the daily accession of manure; and the richness of the land with these daily accessions, became stationary. By a regular course of removing these pens, and immediately ploughing in the manure, the farmer will be agreeably surprised to find, that the improved area will infinitely exceed his hopes; for his ground will be equally enriched by far less dung, on account of these precautions against evaporation, and the cattle will, of course, go over a far greater space.

The land thus manured by the tenth of August, may be sown in turnips, at one pint of seed to an acre, broad-cast. After that period, the pens which had stood from fourteen down to ten days (for the time should be diminished as the cattle fatten) should be removed every seven days, because no draft will be made from the land by a turnip crop, the quantity of the manure is increased, the evaporation is diminished by the length of the nights, and the cattle have improved in plight.

One hundred head of small and ordinary cattle, of the ages common when raised on the farm, and as many sheep, will in this way manure eighteen acres annually, sufficiently to produce fine crops of Indian corn and wheat, and a good growth of red clover after them, with the aid of gypsum; and the clover when preserved by the system of inclosing, will by two year's crops, left to fall on the land, restore it to the plough, richer than the manuring made it. About eight of these acres will also have yielded a crop of turnips, good or bad, according to the season and the soil.

But horses cannot be comprised in this mode of management, because of the inadequacy of their nature to its exposures and hardships. Whatever they are fed on, furnishes some litter, some must be saved to help it out, the manure they make in the summer should be used as late as possible in the spring, and as early as possible in the fall, and the litter saved should only be contemplated to last, until a new supply from the crop

of wheat can come in. These precautions against evaporation, with placing the summer cleanings under cover, or at least where it may be trodden hard, may be resorted to without a great sacrifice of litter or vegetable manure.

Infinitely the most abundant source of artificial manure within the reach of a bread stuff farmer, is that raised in farm-pens during the winter. Skill and industry in this single point would as suddenly, but more permanently, improve the face of our country, as paint does that of a wrinkled hag.

Of these pens, each with a shelter, there should be at least five or equivalent divisions for cattle, bees, sheep and calves, muttons and hogs. A disposition of them ought to be made upon a calculation of economy, as to the combined objects of collecting the litter, carrying out the manure and feeding the animals. After the Indian corn crop is planted, that portion of it excepted, for which the manure of the farm-yards is intended, these animals should be placed on their summer's establishment; every other species of labor on the farm should cease, until the harvest of manure is secured, and its security against evaporation should be an object of as much solicitude, as the security of hay against rain. On making a breach in the body of manure, the olfactory nerves will advise you of the necessity of precautions against this loss. These are, to remove the manure in regular divisions, and not by wounding and mangling it in different places, create channels for the escape of its richest qualities. To deposite it in straight rows, and at regular distances across the whole field to be manured, that the manure first carried out, may be immediately spread and ploughed in after one row is finished. And to spread and plough in well each row, without waiting for a succeeding one. The object is to secure the manure against evaporation as soon as possible after it is exposed to it.

My general rule is to deposite the loads, consisting of as much as four common oxen can draw, in squares at ten yards distant from each other, so that the extreme distance in spreading it, will be five from the centre of each heap. But this general rule admits of important exceptions. If the land fluctuates in fertility, the loads may be deposited at twelve yards' distance, which is a good dressing; and if it is accompanied with gypsum, the quantity to an acre may be diminished one fifth, in consideration of its aid.

For some years I have used gypsum with the coarse manure of the farm yards, and I think it the most beneficial mode of using it. The manure carried out each day is ploughed in, before which one bushel of gypsum to the acre, ground fine, is sown on it, after it is spread.

The reader will recollect that the ground to be manured has been fallowed into high ridges, five feet and a half wide, having a deep and wide water furrow between each ridge. Over this uneven surface, the coarse manure being spread as equally as possible, and sown with gypsum, the ridge is to be reserved by the same three furrows and the same two ploughs with which it was formed, each drawn by four horses. On both sides of the deep furrow, with the mould board towards it, a deep and wide furrow is to be run by a large plough, cutting on its right side with one share, so as to throw the earth it raises by its mould board

into this old deep furrow, and to form precisely in it, a neat ridge or list on which to plant the corn. And the large trowel-hoe-plough, with its two mould boards, splits the summit of the fallow ridge, and throws its earth and manure into the two furrows made on each side by the preceding plough. If these ploughs are of the proper kind, and the operation is well performed, the manure is secured in the best manner against evaporation, the ground is placed in fine tilth, and unless it is of a very unyielding texture, shallow culture thereafter will secure a crop, equal to the capacity of the land.

A considerable saving of labor may be made by a very simple instrument for raising the manure into the carts and scattering the heaps; and by dividing and balancing the laborers so judiciously, that loading, carting, spreading and ploughing may proceed, without having too few laborers at one work, and too many at another. The instrument is precisely a hilling hoe, except that three strong square iron prongs are substituted for the blade. These sink from the usual elevation of a hand hoe by their own weight, into the bed of coarse farm-yard manure, easily rend from its edge or its surface a mass of manure equal to the strength of the laborer, hold it well in raising, and by a small jolt, from the helve's falling on the top of the cart, drop it therein with certainty. In scattering the heaps, they take up the manure, and hold it sufficiently to aid the action of throwing it two or three yards. Over edged instruments their advantages are infinite, as coarse manure must be cut and chopped to pieces with great labor, before these will raise or scatter it; as several strokes are often necessary to obtain a hoe or spade full; and as their contents often fall off in being raised. And over the pitchfork with a horizontal handle, their pre-eminence is little less, as they save the labor of stooping, and possess in a far greater degree the powers of a lever. These pronged hoes are only unfit to scrape together and raise the small quantity of fine manure, which falls to the bottom as the coarse is removed. Hoes and spades collect this as usual. This very simple instrument, a three-pronged hoe, helved in the same angle as a common hilling hoe, has, I think, enabled me for some years to carry out and spread my farm yard manure in half the time it had previously occupied. For many purposes it is also an excellent garden hoe.

Some time may be saved and some skill exerted, even in the simple object of laying off the ground to receive the loads of manure. Being ridged, these ridges and furrows must be the course of the rows of manure, to avoid the inconvenience of crossing them. The person dividing the ground for receiving manure follows one, beginning five yards from the edge of his field, if his rows are to be ten apart, and measuring by the step, which he must by experiments have reduced to considerable accuracy; he digs a hole as he proceeds at one stroke with a hoe, at each spot on which a load is to be deposited. At the same time he watches the quality of the land, and lessens or extends the distances between his holes, according to that criterion.

It is unnecessary to consider whether the animal and vegetable manure I have been treating of, ought to be ranked among the auxiliaries of the atmospherical, or the atmospherical degraded into an auxiliary of theirs. For my part, if I was

driven to the alternative of rejecting one, I should not hesitate to cling to the atmospherical, as the matrix of all; or rather to that portion of it within our reach, by other channels than those of farm yards and animals. I would even prefer a confinement to the single mode of extracting manure from the atmosphere by vegetables, and applying these vegetables to the enrichment of the earth they grow on, by inclosing, to every other mode of manuring land, excluding this. It works so widely, so constantly, and at so small an expense of labor, that properly used, it insures an annual improvement; and a constant progress towards fertility, however slow, must terminate at it. Human life is said to be short, compared with what we know and conjecture of time. Within one fourth of one of these short cycles, I have known a fourfold increase of product from the same fields produced chiefly by the inclosing mode of manuring. Without however insisting on its title to pre-eminence, it surely deserves to be considered as a powerful auxiliary of the valuable modes of manuring land, recently treated of.

To make room for this invaluable article in a system for improving our country, it is necessary to explode and banish a scheme of tillage, founded in the massacre of the earth, and terminating in its murder. It is called the three shift system. Its course is, Indian corn, wheat, pasture. Under it, the great body of the farm receives no manure, and no rest; and the result is, that the phrase "the land is killed and must be turned out," has become common over a great portion of the United States. This system, the most execrable within the scope of imagination, under which the richest country upon earth could not live; being called an improved mode of agriculture at its introduction, was blindly received under that character, and our eyes cannot even be opened by the sound of our own melancholy confessions, "that our lands are killed." As a system for extorting crops from the earth, it is precisely similar to the rack for extorting truth from the sufferer; it stretches, tortures, mangles obtains but little of its object, and half or quite kills its victim.

The system of inclosing, to manure the earth by its own coat of vegetables, is at open war with this murdering three shift system, upon the suppositions, that the matter of these vegetables being chiefly extracted from the atmosphere, must be some accession of fertility to the earth, and that any such accession is better than a perpetual exhaustion. It will probably be conceded by every reader, that both Indian corn and wheat are exhausting crops; there can of course remain no doubt, but that this system impoverishes land two years in three. The only question then is, whether this loss will be compensated, by grazing the field bare during the third year. From whence is the recompense to come? Soft from recent tillage, and unprotected by a strong sward, the land is exposed to all the injury the hoof can inflict. Thinly sprinkled with an insufficient food, the restlessness of perpetual hunger produces unabating industry in the cattle, to tread it into a naked arena, closing its pores like a road against refreshments from the atmosphere, and exposing its flat and naked surface to heat, an agent of evaporation, able to pierce and expel from stone itself. This three shift system has only one merit; honesty. In theory it promises to kill our lands; in practice it fulfils its promise.

The inclosing system requires four shifts, to succeed tolerably well without manure, and extremely well with it. From a long course of experiments, my result is, that a three shift system is far inferior to four shifts, without grazing either; and that one fourth of a farm, properly managed in the latter way; after having been worried by the old rotation of corn, wheat and grazing, may in fifteen years be made to produce more than the whole would previously do. I have kept a farm in three and in four shifts for years, and the result is extremely in favor of the latter, though its land was at first of inferior quality. To this article for manuring our lands, objections are made, among which, the want of pasturage, and the want of space for our labor, should we reduce the size of our fields, are the most serious. Answers to these objections, will be more apposite in considering the subjects of stocks, pasturage and labor, should these essays ever get so far, than in the midst of our present subject. That is, manuring, and the object of this paper, is to confront the inclosing four shift system, with the grazing three shift system, as modes of manuring or improving land.

To illustrate the theory "that vegetables extract their matter chiefly from the atmosphere, and are of course a powerful vehicle for fixing and bestowing atmospherical manure on the earth," the following fact is circumstantially related, on account of its complete application, and to expose it to investigation. Some years ago, a locust tree at colonel Larkin Smith's, in the county of King and Queen, and state of Virginia, received an injury which made it necessary to cut away entirely the bark around its body for eight or ten inches, so that its bark above and below was wholly separated, without a cortical vein between. The wound was entirely covered with a close bandage of some other bark, which lapped beyond the edges of the wounded bark, above and below. And the tree was left to its fate. The plaster bark never grew to the tree, but the edges of the wounded bark, gradually approached each other under its shelter and after several years met and united. By the time the wound was healed, the body of the tree above, had become one third larger than its body below it. And though several years have elapsed the latter has not yet been able to overtake the former. The upper part of the tree, rooted in the air, vastly outgrew the under, rooted in the earth. Therefore it must have drawn either its whole or chief sustenance from the atmosphere. Indeed, between the bark and the wood of most trees, and of the locust particularly, we find the chief channel of their juices; and the communication of these juices was utterly cut off, so that neither portion of the tree could supply the other. If the part of the tree fed from the roots, extracted from the earth, the food, which the earth had previously extracted from the atmosphere; and if the earth was reimbursed gradually by the atmosphere, what it lost in feeding this part of the tree, then even the small acquisition of the tree below the interdict to communication, as well as the great one above, is to be considered as wholly obtained from the atmosphere, and might on that supposition be considered as probable evidence in favor of the theory, that vegetables get from the air and give to the earth. But probable testimony is superfluous, when the superior growth above so

clearly evinces, that they do extract food from the atmosphere.

I might quote the fertile state of new ungrazed countries; their abatement in fertility if grazed though uncleared; the improvement of worn out lands by suffering them to grow up in trees; their greater improvement if these trees are cut down and suffered to rot on the surface, as further proofs that the earth cannot bear a constant drain of vegetable matter, and that this matter in any form enriches it, to evince both the ruinous effects of the three shift system, and that inclosing is the remedy; but the intelligent reader will advert to these and many other considerations, and I only add, that the fact of the earth's surface being the depository of its fertility, proves that this fertility is owing to atmospherical or vegetable matter, and alone determines the efficacy of the inclosing theory.

Though we have past the best, all the resources within our power for manuring land are not exhausted. Whether gypsum is a manure, or a medium for drawing manure from the atmosphere by increasing the growth of vegetables, is an unimportant inquiry. Within the last ten years, I have expended between two and three hundred tons of it in a variety of experiments, which have produced the conclusion that it increases very considerably the product of vegetable matter in almost all forms. Now if most or all of the matter of vegetables is drawn from the atmosphere, and if gypsum increases these drafts, we have only to realize this unexpected treasure by turning it into the earth. It increases like compound interest, and in a few years, land worth only one pound an acre will become worth five. Thus by the help of inclosing, gypsum and vegetables, we may enable ourselves to fix, survey, divide, sell or bestow on our children, atmosphere to a great value. Let us therefore at least admit it into the catalogue of manures, when used in combination with inclosing.

It would be tedious to recite a multitude of experiments in the rapid excursions of an essayist, through the agriculture kingdom, with very little regard to method; and therefore I shall only trouble the public with the results deemed most useful. Except when sown on clover, which it benefits almost at all seasons, I have found gypsum succeed best when covered. I would even prefer harrowing it in with oats and clover, to sowing it on the surface after they are up. The best modes of using it, according to my experience are sowing it on and ploughing it in with coarse litter: sowing it just in advance of the plough, when fallowing for corn, on land well covered with vegetable matter from having been inclosed, so as to bury it with the litter; this is in fact the same experiment with the last, except that the gypsum has less vegetable manure to work upon in the second than in the first case; bestowing on clover annually a top dressing, giving the preference to the youngest, if there should be a deficiency of the gypsum; and rolling both wheat and corn with it, when sown or planted, bushel to bushel. This has been the settled course of a farm for three or four years, and within no equal term has it equally improved. The wheat crop is less benefited immediately than any other, but this rolling of the wheat facilitates the vegetation of the clover sown on its surface in the spring,

and strengthens it against summer drought, so frequently fatal to it in coarse soils; and by thus improving the fertility of the land, considerably augments succeeding crops. Intervals of twelve yards wide, quite across large fields, sown with unplastered wheat, whilst the rest was plastered by mingling a bushel of one, with a bushel of the other, exhibited to a line on each side by the natural growth, an inferiority of strength from the cutting of the wheat throughout the whole period of rest.

The immediate benefit of gypsum to Indian corn, is vastly greater than to any other crop, clover excepted, whilst its benefit to the land is equally great. Unplastered spaces left across large fields of clover, have in sundry instances produced a third or fourth only of the adjoining plastered clover. Unplastered spaces across large fields of corn, have been frequently visible during the whole crop, producing not an equal, but a considerable difference. Gypsum, clover, and inclosing, working in conjunction, have within my own knowledge doubled, trebled, and in a very favorable soil quadrupled the value of land, in the space of twelve or fifteen years; whilst the land regularly produced two exhausting crops, those of corn and wheat in every four years of the period, and these crops were continually increasing.

Of lime and marl we have an abundance, but experience does not entitle me to say any thing of either. About a family, a variety of manures may be thrown together, and form a small store for gardens and lots. Among these, ashes deserve particular attention. Like other manures they suffer by the exposure and evaporation, but less, because water is a menstruum which will convey much of their salts into the earth, if they are spread; the same menstruum conveys most of these salts out of the ashes, if they are exposed to it before they are applied as a manure. Hence when ashes have not been reduced by water in richness, they are to be used as a manure more sparingly, and when they have, more copiously. In their unredacted state, just from the chimney, when sprinkled an inch thick on the long litter and dung from a recently cleansed stable, they constitute the best manure I have ever tried for asparagus. The beds are well forked up in the fall, covered two or three inches deep with the unrotted stable manure, on which the fresh ashes are placed, and so remain until they are thrown into proper order in the spring. [Note C.]

LABOR.

Perhaps this subject ought to have preceded that of manuring, as it is idle even to think of a good system of agriculture in any point of view, if the labor on which it depends is convulsed by infusions the most inimical to its utility; and if those who direct it, are to live in a constant dread of its loss, and a doubt of their own safety. Such a state of uncertainty is painful to the parties, unfriendly to improvement, and productive of extravagance and idleness in all their varieties. Yet those who keep it alive, persuade themselves that they are complying with the principles of religion, patriotism and morality. Into such fatal errors human nature liable to fall, by its deliriums for acquiring unattainable perfection,

One would think that the circles of ethics and logic could not furnish less doubtful questions than these. Were the whites of St. Domingo morally bound to bring on themselves the massacre produced by the liberation of their slaves? Is such a sacrifice of freemen to make freemen of slaves, virtuous or wicked? Will it advance or destroy the principles of morality, religion and civil liberty? Is it wise or foolish?

The history of parties in its utmost malignity is but a faint mirror for reflecting the consequences of a white and a black party. If badges and names have been able to madden men in all ages, up to robbery and murder in their most atrocious forms, no doubt can exist of the consequences of placing two nations of distinct colors and features on the same theatre, to contend, not about sounds and signs, but for wealth and power.

And yet an amiable and peaceable religious sect, have been long laboring with some success, to plunge three-fourths of the union into a civil war of a complexion so inveterate, as to admit of no issue, but the extermination of one entire party. Suppose the extermination shall fall on the blacks, the ferocity acquired by the whites during the contest, and the destruction of the labor in three-fourths of the union, will not endow the remaining fourth with wealth or happiness. If the whites should be the victims of this enthusiastic philanthropy, and our northern brethren should succeed in overwhelming the southern states with the negro patriotism and civilization, what will they have done for the benefit of the liberty, virtue or happiness of mankind? The French revolution, bottomed upon as correct abstract principles and sounder practical hopes, turned out to be a foolish and mischievous speculation; what then can be expected from making republicans of negro slaves, and conquerors of ignorant infuriated barbarians? What can those who are doing the greatest mischiefs from the best motives, to their fellow-citizens, to themselves and to their country, expect from such preachers of the gospel, such champions of liberty, and such neighboring possessors of a territory larger than their own.

But what will not enthusiasm attempt? It attempted to make freemen of the people of France; the experiment pronounced that they were incapable of liberty. It attempted to compound a free nation of black and white people in St. Domingo. The experiment pronounced that one color must perish. And now rendered blinder by experience, it proposes to renew the last experiment, though it impressed truth by sanctions of inconceivable horror; and again to create a body politic, as monstrous and unnatural as a mongrel half white man and half negro.

Do these hasty, or in the language of exact truth, fanatic philosophers, patriots or Christians, suppose that the negroes could be made free, and yet kept from property and equal civil rights; or that both or either of these avenues to power could be opened to them, and yet that some precept or incantation could prevent their entrance? As rivals for rule with the whites, the collision would be immediate, and the catastrophe speedy. Divested of equal civil rights and wealth to prevent this rivalry, but endowed with personal liberty, they would constitute the most complete instrument for invasion or ambition, hitherto forged throughout the entire circle of human folly.

For what virtuous purpose are the southern runaway negroes countenanced in the northern states? Do these states wish the southern to try the St. Domingo experiment? If not, why do they keep alive the St. Domingo spirit? War is the match which will in the course of time be put to such a spirit, and an explosion might follow, which would shake our nation from the centre to its extremities. Is it humanity, wisdom or religion, or some adversary of all three, which prepares the stock of combustibles for this explosion?

Suppose France was about to invade the United States, and should ask congress previously to admit a million of her most desperate people into the southern states, ready to join and aid her armies; could the northern members of the union find any motive drawn from policy, religion, morality or self-interest, for agreeing to the proposal? And yet in case of such an invasion, a million of negroes, either slaves, but artificially filled with a violent impatience of their condition, and deadly hatred of their masters; or free-men, but excluded from wealth and power, would hardly be less ferocious, merciless or dangerous, than a million of desperate French people.

A policy which weakens or renders incapable of self-defence at least three-fourths of the union, must also be excessively injurious to the remaining fourth, whose wealth and security must increase or diminish by increasing or diminishing the wealth and security of the larger portion. Nor does the least present gain, afford to the northern states a temptation for incurring so dreadful an evil. Their manners will neither be improved, nor their happiness advanced, by sprinkling their cities with a yearly emigration of thieves, murderers and villains of every degree, though recommended by the training of slavery, a black skin, a woolly head, and an African contour.

And yet even the northern newspapers are continually dealing out fraternity to this race, and to this moral character, and opprobrium to their white masters, with as little justice in the last case, as taste in the first. What had the present generation to do with the dilemma in which it is involved? How few even of its ancestors were concerned in stealing and transporting negroes from Africa? If some remnants of such monsters exist, they are not to be found in the southern quarters of the union. And if self-preservation shall force the slave-holders into stricter measures of precaution than they have hitherto adopted, those who shall have driven them into these measures, by continually exciting their negroes to cut their throats, will accuse them of tyranny with as little reason, as the prosecutor of the slave trade accuses them of negro stealing.

The fact is, that negro slavery is an evil which the United States must look in the face. To whine over it is cowardly; to aggravate it, criminal; and to forbear to alleviate it, because it cannot be wholly cured, foolish. Rewards and punishments, the sanctions of the best government, and the origin of love and fear, are rendered useless by the ideas excited in the French revolution; by the example of St. Domingo; by the lure of free negroes mingled with slaves; and by the reproaches to masters and sympathies for slaves, breathed forth from the northern states. Sympathies, such as if the negroes should transfer their affections from their own species to the baboons. Under impres-

sions derived from such sources, the justest punishment will be felt as the infliction of tyranny, and the most liberal rewards, as a niggardly portion of greater rights. For where will the rights of black sans-culottes stop?

Such a state of things is the most unfavorable imaginable to the happiness of both master and slave. It tends to diminish the humanity of one class, and increase the malignity of the other, and in contemplating its utter destitution of good, our admiration is equally excited, by the error of those who produce, and the folly of those who suffer it. Slaves are docile, useful and happy, if they are well managed; and if their docility, utility and happiness are not obstructed by the circumstances adverted to in the last number. Knowledge manages ignorance with great ease, whenever ignorance is not used as an instrument by knowledge against itself. But our religious and philosophical Quixotes have undertaken to make ignorance independent of knowledge. They propose to bestow a capacity for liberty and rule on an extreme degree of ignorance, when the whole history of mankind announces, that far less degrees possess no such capacity. One would suspect, except for the integrity of these divines and philosophers, that they were imposters disguised in the garb of religion and philosophy, striving to disengage a mass of ignorance from those who now direct it, for the purpose of appropriating it to themselves. Free it cannot be. It must become the slave of superstition, cunning or ambition, in some form. And what is still worse, when thrown upon the great national theatre to be scrambled for, that interest which shall gain the prize, will use it to oppress other branches of knowledge. In its hands the blacks will be more enslaved than they are at present; and the whites, in pursuit of an ideal freedom for them, will create some vortex for engulfing the remnant of liberty left in the world, and obtain real slavery for themselves.

Under their present masters the negroes would enjoy more happiness, and even more liberty, than under a conqueror or a hierarchy. Slavery to an individual is preferable to slavery to an interest or faction. The individual is restrained by his property in the slave, and susceptible of humanity. An interest or faction is incapable of both. Did a hierarchy or a paper system ever shed tears over its oppressions, or feel compunction for its exactions? On the contrary, joy swells with the fruit of guilt; and the very conscience, which abhors the secret guillotine, used to cut out a neighbor's purse, and transfer it to its own pocket, without difficulty retains the contents. Thus men imagine that they have discovered a way to elude the justice of God, whose denunciations have overlooked chartered corporations, and are only levelled against individuals. The crime, they suppose, is committed by a body politic, and scripture having exhibited no instance of one of these artificial bodies being consigned to the region of punishment, their oppressions, however atrocious, are considered as a *casus omissus*, and as affording a mode for fattening the body with crimes and frauds, without hurting the soul.

It is otherwise with the personal owner of slaves. Religion assails him both with her blandishments and terrors. It indissolubly binds his, and his slave's happiness or misery together. These associates he cannot sever; he chooses the

alternative indeed for both, but he must choose the same.

If an interest or a combination of men is the worst species of master, and if this black mass of ignorance, turned at large and defined by the plainest marks, must naturally fall under the dominion of some interest or combination, the miseries inflicted both on their owners and themselves, by the perpetual excitements to insurrection, and those to be expected from the experiment whenever it is made, are attended with no compensating counterpoise whatsoever to either of the parties, even in hope. Should these fruitless attempts be forborne, and should the slave states take measures for abolishing these excitements to general disquietude and calamity, some system for the management of slaves, beneficial to themselves and their owners, is so closely connected with agriculture, that the next number will be devoted to that subject.

Animal labor is brought to its utmost value, by being completely supplied with the necessaries and comforts required by its nature. These comforts have more force to attach the reasonable than the brute creation to a place, and yet the attachments of the latter from this cause often are strong. The addition of comfort to mere necessaries is a price paid by the master, for the advantages he will derive from binding his slave to his service, by a ligament stronger than chains, far beneath their value in a pecuniary point of view; and he will moreover gain a stream of agreeable reflections throughout life, which will cost him nothing.

A project towards an object so desirable, may possibly contain a hint which some one will improve. Let the houses of the slaves be of brick walls, able to withstand hard usage, and remain tight, built in one connected line, with partitions, making each a room sixteen or eighteen feet square; let there be a brick chimney in the centre between each two rooms, affording a fire place to each, and two warm chasms, one on each side of the fire place for beds. A square window, with a wooden shutter, to be opposite the door of each room, and three panes of glass above each door. No joists or loft, but to be lathed on the rafters and their couplings, nearly to the top of the roof, and the whole inside to be plastered. Hence, though the house should be low, the pitch of the rooms will be high; and salubrity will be consulted with a precaution against fire, amounting to a certainty within the house, as there will be no inside fuel, the floor being of earth. The roof will be a mere shell plastered within, and if the chimneys are sufficiently high, the absence of interior combustibles, combined with the lowness of the house, will form a great security against fire, so frequently fatal to the houses of slaves, and sometimes to the inhabitants.

A regular supply of a winter's coat, jacket and breeches, with the latter and the sleeves of the former lined, two osnaburg shirts, a good hat and blanket every other year, two pair of stockings annually, a pair of shoes, a pair of summer overalls, and a great coat every third year, will constitute a warm clothing for careful slaves, and the acquisitions they make from their usual permissions will supply them with finery.

The best source for securing their happiness, their honesty and their usefulness, is their food; and yet it is seldom considered as a means for ad-

vancing either. If the happiness of an idle epicure is deeply affected by food, what must be its influence upon labor and hunger? In the article of food, the force of rewards and punishments may be happily combined to unite the whole body of slaves into conservators, instead of being pilferers of the moveables on a farm. It may be made both a ligament to tie the slave to its service, and enable him to perform that service better. A scheme for producing these ends has been found so successful in practice, and coincides so entirely with the subject of agriculture by slaves, that it is chosen to terminate this subject. Bread alone, ought never to be considered as a sufficient diet for slaves, except as a punishment; and at one meal each day they should have salt meat boiled into a soup with peas, beans, potatoes, turnips, cabbages, cimblins or pumpkins. At other meals, salt fish, milk or butter milk. Vegetables are raised in great abundance at little expense, and at all seasons a supply of some species should be allowed to the slaves without stint. We shall be astonished upon trial to discover that this great comfort to them, is a profit to the master, in its single effect of contributing to their health without estimating the benefits arising from a cheerful acquiescence in their condition. One great value of establishing a comfortable diet for slaves, is its convenience as an instrument of reward and punishment, so powerful as almost to abolish the thefts, which often diminish considerably the owner's ability to provide for them. These can seldom or never be committed without being known to the other slaves, but they are under no interest to restrain them. It is the interest of all to steal, by which they occasionally get some addition to bread, if this addition cannot be procured by honesty. But if thefts are punished by placing the whole on that diet, all will have an interest to prevent and forbear theft, provided a diet much more profitable is thereby secured. Nor is involving all in the punishment a hardship, because all share in the benefit, which nothing but this system for preventing the waste of theft can produce; and because a knowledge of the criminal is usually general. It is this unavoidable knowledge, which makes the innocent comrades, who will not surrender their own daily comforts, that another may occasionally steal luxuries, a solid check upon theft. The better the diet of negroes, the more effectual will such a system become.—It should be executed rigidly, so as to produce a loss of food additional to bread, of double value to the thing stolen, except the guilty person is detected, who ought in that case to sustain the whole punishment, which must either be corporal, or a sale to some distant place. The latter, combined with the enjoyments provided for slaves by this system, will soon become an object of terror; and as many buyers care little for moral character, it is unexceptionable, provided the seller states it fairly, and records it in the bill of sale, as he ought to do, for his own honor and security.

A daily allowance of cider will extend the success of this system for the management of slaves, and particularly its effect of diminishing corporal punishments. But the reader is warned, that a stern authority, strict discipline, and complete subordination, must be combined with it, to gain any success at all; and that so long as white soldiers cannot be kept in order, or rendered useful, with-

out all three, he is not to expect that black slaves can without either; nor that those can be governed by the finest threads of the human heart who possess only the coarsest.

Those tied by habit to the rotation of corn, wheat and pasture, or the three shift system, object to the inclosing and four shift system, "that having labor adequate to the tilling one third of their arable land, a portion of it would be unemployed, by restricting this labor to the cultivation of a fourth only." The rotation of corn, wheat and clover for two years, without being cut or grazed, need only be confronted with its rival course, to satisfy the reader, that under the latter system, the fourth will soon overtake the third in product, and at length infinitely exceed it. The profit of making greater crops from less land, is visible at once. The same crop from a fourth may produce profit, and yet a loss from a third. If 120 acres of poor land produce 120 barrels of corn, and the expenses of cultivation amount to a barrel an acre, there is no profit; but if 90 acres of the same land are improved by inclosing, so as to produce 120 barrels, there will be a profit of 30 barrels. This principle equally applies to every case of an existing profit under the three shift system, because whatever it may be, it is greatly increased by obtaining an equal crop by cultivating less land.

The error of making the mode of cultivation subservient to fluctuating labor, instead of adapting the labor to permanent land, however egregious, cannot properly be termed vulgar, because it is common to men of the best, as well as to those of the meanest understandings. However glaring it is, it really constitutes the most stubborn argument in favor of using labor to kill rather than to improve land; and though some readers may think it idle to controvert a mistake, apparently not within the scope of human weakness to commit, the greater number will, I fear, consider the application of labor to the improvement, rather than to the impoverishment of land, as far more ridiculous. The collision between these opinions, will excuse the matter of this number, though it may seem trite to some, and visionary to others.

An application of labor to land, which daily diminishes the fertility of the land, considered in a national light, is obviously a national evil; and a habit from which such boundless or wide ruin and depopulation must ensue, supposing it to be general, seems incapable of deserving the approbation of virtue, or the concurrence of selfishness. If the employment of labor in the course of corn, wheat and pasture, produces a regular impoverishment of the soil, the practice falls within the scope of this observation.

It is equally at enmity with the purest devotion of self-interest, which ever chilled the human heart. This devotion pants for compound or increasing, not for decreasing interest; and beholds with horror a diminution of principal. Our three shift system gradually destroys the principal, land, and gradually diminishes the interest, crop. If the labor increases as in the case of slaves, the effect is not to enrich, but to impoverish the owner.

Flight is his resource against the poverty he derives from the increase of his slaves. If the application of labor to the impoverishment of land was universal, an emigration to another world, would be the only remedy; if national, it must

amount to an abjuration of our country and form of government; if state, to a banishment from our native soil and relations. But this miserable remedy itself will ere long be exhausted, and after an internal struggle for the best birth in a bed of thorns, the discovery will be made, that an endeavor in each to feather his own nest, is the only way to procure comfort for all; and that the prosperity of the nation and the happiness of individuals depend on the improvement of land by a proper application of labor.

But what shall we do with our surplus labor, is repeated, if we cease to employ it in killing land? One would think that this doubt could never be entertained, except by a fatalist, who believed that such was the end for which labor was created. The effects of labor are the same in agriculture as in architecture; far more is necessary to build than to destroy; shall we thence also infer, that labor is destined to destroy houses? Where is the difference between destroying houses and destroying the means by which houses are rendered comfortable? The early Kentucky settlers contended, that unless the sugar makers killed the sugar trees, it threw a portion of their labor out of employment, and therefore inferred, that it was one of nature's wise laws, that labor should kill the sources of sugar. Did they borrow this opinion from our querist, who thinks it wise and natural to employ it in killing the source of bread? If an abundance of labor caused a land killing agricultural system, and its scarcity the reverse, Flanders should be a wilderness and Virginia a garden. A great recommendation of the inclosing and four shift system, is the saving of labor it creates in fencing, and in renouncing the culture of exhausted lands, to be applied to improvement. When we come to consider a project for the management of a bread stuff farm, we shall discover full employment for this surplus labor, which the three shift system fears would be idle, if not employed as a land executioner. The raising of manure, covering with clover every spot of land which will bear it, and converting all moist land into meadow would alone be sponsors for the futility of the apprehension. And yet many other objects of labor must be combined with the four shift and inclosing system, to accelerate and augment the rewards it will bestow. Hay in abundance must be made, crops will be augmented, modes of tillage must be improved, transportation with litter, manure and crops, and gypsum, if resorted to, is by no means niggardly in providing employment for labor. If these observations have not removed the apprehension of ruin, seriously and generally entertained by the disciples of the corn, wheat and pasture rotation, should they change the application of their labor from impoverishing to improving their land, it will still be removed by their own superior reflections, if they will be pleased to reflect. They will certainly discover that the danger of wanting employment for their labor, lurks, not in improving but in impoverishing their lands, and that whilst they shudder at an apparition, they are embracing an assassin.

INDIAN CORN.

It was very improbable that one who has often joined in the execration of Indian corn, should have

been destined to write its eulogy. Had we designed to transfer from ourselves to an innocent plant the heavy charge of murdering our land, its acquittal before a jury whose own condemnation would be the consequence, could not be expected; but as nothing is more certain than that the exclamations against corn and tobacco (and for the last thirty years wheat ought to have been placed at the head of the triumvirate) for killing our lands, have proceeded from conviction, without a suspicion that we ourselves were the perpetrators of the act; I shall venture to bring Indian corn to trial before the real criminals, and its mistaken accusers.

Arthur Young, in his travels through France and Spain, observes, that the regions of maize exhibited plenty and affluence, compared with those where other crops were cultivated. As a faithful agricultural annalist, he records the fact; being but little acquainted with the plant, he could not satisfactorily account for it. Even a nation which has lived with it, and almost upon it for two hundred years, so far from correctly estimating its value, have only learned to eat it, but not to avail themselves of half its properties. Those for killing land, they have turned to the utmost account; those for improving it, they have wholly neglected. The first capacity is common to all crops; the last is possessed by few. Indian corn produces more food for man, beast and the earth, than any other farinaceous plant. If the food it produces for the two first was wasted, and men and beasts should thence become poor and perish, ought their poverty or death to be ascribed to the plant which produced the food or to those who wasted it? Is Indian corn justly chargeable with the impoverishment of the earth, if the food it provides for that is not applied?

If the theory which supposes that plants extract most or all of their matter from the atmosphere, and that the whole of this matter is manure, be true, then that plant which produces most vegetable offal must be the most improving crop, and it will hardly be denied that Indian corn is entitled to this pre-eminence.

Let us compare it with wheat. Suppose that the same land will produce as much grain of the one as of the other which in its use will make equal returns to the earth. Here the equality ends, if indeed it exists even in this point. The corn stalks infinitely exceed the wheat straw in bulk, weight, and a capacity for making food for the earth. If any attentive man who converts both his stalks and straw into manure, will compare their product in April, when he may distinguish one from the other, he will find of the former a vast superiority in quantity. The English farmers consider wheat straw as their most abundant resource for manure, and corn stalks are far more abundant; corn therefore is a less impoverishing because a more compensating crop to the earth, credited only for its stalks, than any in England. In comparing crops, to ascertain their relative product, and operation on the earth, we must contrast farinaceous crops with each other; and consider the litter or offal they produce, not as wasted but as judiciously applied to the compensation of the land. At the threshold of the comparison, corn exhibits a return from the same land of more offal or litter in its stalks alone, than wheat does altogether. But to the stalks of corn, its blades, tops, shucks, and cobs remain to be added, each of

which will nearly balance the litter bestowed on the land by wheat. Not only the quantity of the vegetable matter produced by corn, is far greater than the quantity produced by wheat, but the quality is better, and the risk of loss from evaporation less. The straw of wheat after it is ripening or ripe, standing or lying out on the ground, is vastly diminished in weight by moisture, and injured after it is cut, even by dews. I think I have known it thus lose two thirds of its weight. Among the several kinds of litter furnished by corn, the shucks and cobs lose nothing of their value by evaporation; the rind of the stalks seems intended by nature to resist it, that the farmer may have time to save them both as food and litter; from the same rind the top derives some security, and the fodder is only exposed to it as grass is in being made into hay. But the quality of every part of the corn offal is better as manure than the wheat offal. The cob is said to be a valuable food, reduced to meal; it so it probably contains an oil. The stalk abounds in salts far beyond wheat straw. The tops and blades, cured green, save from evaporation salts lost by straw. And even shucks, being more nutritious as food, must be allowed some degree of richness beyond the straw. The whole of the corn offal is better food than wheat straw, but its blades and tops are so greatly superior, that cattle prefer them to hay, and will fatten on them as well. The corn offal can therefore maintain a fat herd, furnishing abundantly that which forms a compound with vegetable matter, of the richest consistence. To this object the straw is incompetent.

Let us now compare corn and wheat as farinaceous food only. Corn, in a proper climate for it, produces more farinaceous matter than wheat to the acre, from the richest down to the poorest soil; and hence also results a greater return to the earth. The highest product of corn I have heard of in the United States is 125 bushels to the acre, of wheat 60, a difference somewhat diminished by the difference of weight. Fifty bushels of corn to the acre are almost invariably produced by land well manured and well cultivated, whereas even half that crop of wheat is extremely rare. And in districts where the average crop of wheat is five, that of corn is usually about fifteen bushels an acre. Besides, corn, both growing and gathered, is less liable to misfortunes than wheat.

Indian corn may be correctly called meal, meadow and manure. To its right to the first title, almost every tongue in the largest portion of the United States can testify; to the second, an exclusive reliance on it for fodder or hay, in a great district of country during two centuries, gives conclusive evidence; but the rueful countenance of this same district, either disproves its claim to the third, or disallows any pretension of the inhabitants to industry or agricultural knowledge.

In Europe no husbandman expects a tolerable crop of any kind, except the land has been well manured within seven years at most; here we have obtained for two centuries from Indian corn, bread, meat, and fodder, without giving it, generally speaking, a dust of manure, or allowing any rest to the land which produces it. Is there any country in Europe able to bear this draft for such a period, without exhibiting the cadaverous aspect of the corn district of the United States?

But not content with bestowing on other crops

the meager modicum of manure, which happened to lie unavoidably in the way of ignorance, whilst the maintenance of every thing was required of corn, without allowing it any, we have suffered the manure provided by corn itself to waste and perish; and having both withheld from it foreign aids, and transferred to other plants the small portion of its own resources for manure, which accident may have saved, and permitted the residue to be lost, we charge it with being an exhausting and killing crop.

Such is the experimental process hitherto pursued, but it must be reversed, before the question can be tolerably understood or fairly determined. It will be reversed by converting every dust of its offal into manure, and manuring highly for corn. With good cultivation, an acre of well manured land seldom produces less than fifty bushels. This crop furnishes also other food equivalent to a tolerable crop of hay, and such an abundance of means for raising manure, that I have no doubt if properly applied, it would be a resource for our even shortening the English manuring rotation, which embraces the whole farm every seven years at most. Hence I conclude that corn, besides being the most productive of any farinaceous crop, is also the least impoverishing, and even an improving crop aided by inclosing.

The brevity I have prescribed to myself, induces me to pass over several inferior superiorities of Indian corn, and to conclude its encomium with one of peculiar value. As a fallow crop, it is unrivalled, if, as fallow crops ought constantly to do, it receives the manure. Arthur Young proves the vast superiority of a fallow crop over a naked fallow in England, where a crop greatly inferior to corn in value, is necessarily used. This is usually peas or beans. It is less productive, less valuable as bread stuff, less fraught with fodder, almost wholly destitute of litter for raising manure, more precarious, more liable to disaster after it is gathered, more chargeable in point of seed, and requires more skill, trouble and expense in its cultivation. Under all these disadvantages, a fallow crop in England is preferable to a naked fallow. Under all the advantages of using corn as such, it becomes a brilliant object in America, if attended with a complete manuring, as fallow crops in England invariably are. In that case, fifty bushels of corn and thirty of wheat may be expected from good culture. No value is produced in England by the fallow crop and the following wheat, equal to eighty bushels of bread grain. But credit to corn the savings and additional produce arising from the above enumerated considerations, and it certainly promises to the American farmer, far greater benefits from a good system of husbandry, than any crop within the reach of an English farmer.

The plant which contributes in the greatest degree to national subsistence, best deserves the patronage of skill and industry; and yet the cultivation of maize remains as it was borrowed from the aboriginal farmers of America, except, that if product is the test of science, they must be allowed to have been more accomplished husbandmen than their imitators. As the Indians certainly made better crops to the acre, and preserved the earth in better heart, than we do, we may at least hope to accomplish a degree of perfection, which from their success we know to be attainable,

however deterring may be the prospect of our ability to improve upon it. If indeed we could be persuaded to relinquish what we have retained of this indigenous system, and to draw one from scientific principles and European experience, perhaps we might recover the palm in the cultivation of maize, from those to whom we have ourselves assigned it by special cognomination.

Neither in theory or practice, in Europe or elsewhere, did we ever hear of condemning land perpetually to severe crops, two years out of three, without aiding it by any species of manure. But if we add to this system the two items with which it is usually attended, one, close grazing the year of rest, as it is called, (a rest like that enjoyed by a man first stunned with blows and then trampled to death,) the other, frequent ploughings of two or three inches deep to let in sun and keep out atmosphere as much as possible, it would be viewed as the most complete agricultural caricature hitherto sketched by the finest fancy for the ridiculous.

In England, a thorough manuring universally attends a fallow crop, the effect of which is a medium product of wheat, of about thirty bushels to the acre. Let manuring attend maize as a fallow crop, and we follow this example. To come up to it, however, we must get our land into equal heart with theirs, when it receives this manuring; and then we should be able fairly to estimate the value of Indian corn. In its cultivation, the first improvement required is, therefore, to manure it at the usual rate of other fallow crops.

The second is to plough vastly deeper than we plough at present. In our dry and hot climate, the preservation of the moisture, and the inhalation of the atmosphere, are sufficient reasons for this. To these are to be added, the deepening of the soil, and an increase of pasture for the plant. The maize is a little tree, and possessing roots correspondent to its size, these roots will of course strike deeper, both to procure nourishment, and to strengthen this small tree against severe winds. It follows, with a great degree of probability, that this large plant requires deeper ploughing than a smaller one. Yet we plough shallower in its cultivation than the people of Europe do in cultivating wheat.

I shall here endeavor to prove the truth of a pair of paradoxes. One, that shallow ploughing increases; the other, that deep ploughing diminishes labor. A single observation almost suffices to sustain both. By shallow ploughing, the seeds of grass and weeds are kept near the surface throughout the year, locked up by frost, drought or immersion, ready to sprout up on the occurrence of every genial season, when they appear in millions, and instantly require the plough, however recently used; by deep, if skilfully done, these seeds, which abound most near the surface, are deposited below a depth of earth, which they penetrate slowly and in small numbers, so that the repetition of ploughing is far less necessary.

One or two deep ploughings, according to the nature of the soil, will, with the subsequent use of the skimmer or the harrow, serve to make the crop of corn; in place of which at least four or five shallow ploughings, with the same aid, will often destroy it.

To demonstrate the difference in point of labor, I will describe the tillage of corn as I practise it to some extent, and leave the reader to make the

comparison in his own mind with the usual mode of cultivation.

The rows are never ploughed but in one direction, cross ploughing being wholly abandoned. Their width is five and a half feet. The field being once thrown into the position of ridges and furrows, never requires to be laid off again. The furrow is left as deep as possible, and when the field comes again into tillage, the list or ridge is made upon this furrow, so that there is a regular alternity between ridges and furrows. If the soil is of a friable nature, a large plough drawn by four horses, and cutting a sod about twelve inches wide and eight deep, is run on each side of this old furrow, and raises a ridge in its centre, on which to plant the corn. The old ridge is split by a large trowel-hoe-plough, having a coulter on the point, two mould-boards, drawn by four horses, and cutting ten inches deep. If the soil is stiff or tough with turf, the first plough, with four horses, ridges or lists on the old water furrow, with four furrows of the same depth and width. On the summit of this ridge or list, a deep and wide furrow is run with a trowel-hoe-plough and two mould boards, in which the corn is planted and covered between two and three inches deep, with the foot. The planting is guided by a string carried across the ridges, with colored marks at the distance apart intended for the corn. This furrow is a complete weeding of the ridge previous to planting, which it should barely precede. The corn receives no more ploughing until it is thinned and hand-hoed along the rows, about two feet wide. After this a deep furrow is run on each side of it by a large plough, drawn by two horses, with a mould board, causing the earth thrown out of it to meet at the corn, though the furrow is a foot from it. Thenceforth the tillage consists of a streak or furrow of a mere weeding plough, called a skimmer, cutting with two wings twenty-four inches—drawn by one horse; and of a central, deep and wide furrow, made with a trowel-hoe and two mould boards, drawn by two horses, to be repeated when necessary. The whole to be concluded with a narrow weeding or hand-hoe along the slip in the direction of the row, not kept completely clean by the skimmer.

The judicious reader will discern, that the effects of high ridges and deep furrows, in cultivating corn, are numerous. The corn is planted immediately over the furrow of the preceding crop, and by completing the reversal of the ridge early in its culture, it grows upon a depth of tilth three or four times exceeding what is attained by planting and cross ploughing in the usual mode. Its roots are never cut in one direction, and this great depth of tilth thus early obtained, by superseding the occasion for deep ploughing in the latter period of its growth, saves them in the other. The preservation of the roots, and their deeper pasture, enables the corn much longer to resist drought. The litter of inclosed grounds, thrown into the deep furrow upon which the corn list is made, is a reservoir of manure, far removed from evaporation; within reach of the roots, which will follow it along the furrow; and calculated for feeding the plant in droughts. The dead earth brought up by the plough from the deep furrow is deposited on each side of it, without hurting the crop on the ridge, and with the bottom of the furrow remains four years to be fructified by the atmosphere, so

as to escape the present loss, sometimes accruing from mingling too much dead earth with the soil by deep flat ploughing, and yet to mellow and deepen it more rapidly. And much labor is saved in planting the corn, whether the hoe is used after a string, or the string is carried across furrows previously made on the ridge.

In all lands unable to produce forty bushels of corn to the acre, the considerations of produce and saving labor united have determined the proper distance to be five and a half feet square, with two or three stalks at each station, except in poor spots where one will suffice. If it can produce that crop or more, I have planted it at the distance of five feet six inches, by two feet nine, leaving two stalks in sandy, and three in stiff lands. Deep ploughing in one direction, by shielding the corn against drought, and saving its roots, allows it to be planted thicker than usual.

Young's experiments have ascertained that fallow crops are more profitable than naked fallows. Several superiorities of Indian corn over the fallow crops used in England, have been noticed. The following are, I believe, omitted. The high ridges produced by the mode of cultivation I have adopted, double the surface exposed to the atmosphere, and lessen by one-half that exposed to the sun, so as to increase inhalation and diminish exhalation very considerably. No other fallow crop will enable us to obtain these benefits by the agency of the plough, because none of them will admit of being drilled sufficiently wide apart, nor admit of an equal use of the plough.

Corn is a fallow crop, peculiarly adapted to co-operate with the system of inclosing; whereas a fallow for wheat, by which an ungrazed lay of grass, weeds, or even of red clover is turned under, frequently defeats the hopes of the farmer. Hence he is seduced into the ruinous practice of feeding off his clover before he commences his fallow; a practice under which very rich land only will improve; whereas the heaviest cover, turned under by a large plough and four horses, is a pledge for good crops both of corn and wheat, owing to the quality of the former of thriving upon the food yielded by coarse litter, and the time gained during its growth, for reducing this litter to the proper food for the latter.

The winter's manure, like this litter, is also made more extensively beneficial to a crop of wheat, than if it had been exposed to putrefaction throughout the summer, because whatever escapes into the atmosphere, during a violent summer's fermentation, is lost both to the earth and to the crop of wheat; whereas the fermentation is less violent, when this litter is mingled with the earth, which catches a portion of its fertilizing qualities as the slow putrefaction proceeds, and less of the manure is lost when the wheat is sown, than if rotted in a body, whereby much of it is dissipated in the atmosphere; a dissipation which corn partly prevents, and partly saves.

The manure made on the winter's farm pen remains wet, cold, and unrotted until the month of April, and when composed of corn stalks is of a rough and hard nature. Yet land covered with fifty loads and sown with one bushel of gypsum to an acre, will produce three-fold more corn than in its natural state; and this crop is made in five months; a space just sufficient to reduce the coarse litter to a pabulum proper for wheat. The

better this coarse litter and the earth are divided and mingled, the less will be the fermentation, and the greater the crop. The sudden growth of the corn, demonstrates the vast benefit to be derived from litter as coarse and hard as corn stalks, whilst their degree of the putrefaction is inconsiderable, and consequently the vast loss sustained by completing this putrefaction, without gaining a valuable crop from its process. After the process of fermentation and putrefaction is finished in the earth, the residuum is the same, as if it had been finished out of the earth; besides this residuum, supposed by the old theory of compounding, stirring and rotting dunghills, to contain all the fertilizing qualities of vegetable matter, Indian corn enables us to reap a rich harvest of bread stuff from the process towards it.

The same property of Indian corn presents us also with a vast addition to our vegetable matter for manure. The crop of offal as well as that of food, is augmented three-fold by the matter separated from the coarse litter in reducing it to manure proper for wheat. This of itself exhibits the vast preference of corn as a fallow crop, to the application of rotted manure to a naked fallow for wheat. No two crops can be so exactly fitted for advancing a good system of agriculture. The coarse organs of the one, relish the food rejected by the delicate organs of the other, and by the economy of saving what would otherwise be lost, not only enable us to obtain an additional crop, but by increasing our means for raising manure in a three-fold ratio, must have the effect of increasing the crops of wheat themselves, far beyond the confines to which they are limited by naked fallows.

The reader will remember, that Indian corn is to be planted on a high ridge, and that cross ploughing is excluded. These ridges should run north and south, to equalize both the benefits and injuries derived from the sun. The injury suffered by a flat surface from its excessive heat, would be rather increased than diminished, by exposing one face of the ridge to the south, whilst the northern aspect would lose the benefit of its genial warmth. These high ridges have another important effect. However steep the declivity, we never see the roots of trees, shrubs or grasses, penetrating through the ground into the atmosphere. It is of course evident that they recoil from one element, and bend towards their food in the other, wherever it is to be found. By the position of the corn on high ridges from its infancy, the roots on approaching the declivity on each side, are trained to run lengthways of the ridge, and thus escape the injury they would otherwise sustain by getting into the range of the deep middle furrow.

As it would be unreasonable to expect the reader to recollect observations made in considering the subject of manuring, I shall remind him that the ground intended to be manured for Indian corn is fallowed in the winter; that before or after the rest of the crop is planted, this manure is carried out, ploughed in, and the corn to be benefited by it planted; and that before it receives any ploughing, the corn is to be thinned and weeded, or hand-hoed. This process will bring us into June, and allow an interval for recruiting the teams, when clover is in its best state for that end. By this time the corn is from eight to twenty-four inches high. At this juncture the deep furrow before mentioned on each side of it being run, nar-

rows the ridge for about eight days, until it is again widened by the middle furrow; and that space will suffice to give to the corn roots the longitudinal direction which shields them against all injury; this furrow being the only deep one received by the corn after it is planted, (the water furrow excepted, out of the way of which the roots are thus trained,) being bestowed on it whilst it is young and its roots short, and being run near a foot from it, the roots of the corn, by this mode of culture, wholly escape injury, and the effects of drought on the plant being thus diminished, its product is increased.

The first ploughing, which is to answer the end both of a fallow and a list or ridge on which to plant the corn, is by far the most material part of the system, and indeed the only good security for its success. The furrow must be deep and wide, so as to overturn into the old water furrow, a considerable mass of the litter produced by inclosing, whether weeds or clover. This mass, in addition to its being a reservoir of food, gradually supplying the corn during the summer as it putrefies, operates powerfully in preserving the friability and mellowness of the earth by the passage of air perpetually escaping from it, through its tegument, into its congenial element. By this process the propensity of hard and cold soils to run and bake is removed or diminished; a propensity which is encouraged in the highest degree by shallow ploughing on naked or grazed fields. And by the same process, the inconveniences of a mass of dry litter, on enclosed fields, combined with shallow ploughing, are also avoided; because it is so well buried, that the corn is planted above it, and sprouts in a bed of clean earth.

The accidents to which Indian corn is liable, are far inferior to those of any other farinaceous plant, and less remediless. It comes up better; it may be replanted, and at last it may be transplanted. This last precaution for insuring a crop, is executed with little labor, by planting a portion of it very early, in the quarter of the field where it will vegetate and grow quickest, somewhat thicker, to furnish plants; and by transplanting those drawn out in thinning in moist weather, or after a season, as the tobacco makers say. The corn plants will live better than those of tobacco or any other herb I have ever tried, and may be transplanted until they are eighteen inches high. The large plants will be equal to the smaller and later planted corn. Indeed I often fill up vacancies by setting the plants of the same field as it is thinned, and always thin as I set to avoid a double perambulation. A pointed stick both aids in thinning and in setting the corn, which is done nearly as rapidly as tobacco is planted.

I repeat a fact which most people know, to remove an objection against the very deep ploughing recommended as the basis of the corn crop, arising from an erroneous opinion in a few, that the roots of corn and most other herbaceous plants, seek their food only near the surface; whereas the roots of wheat will penetrate four feet of tilth, and those of corn will strike still deeper. An objection that the roots of the latter will not reach the reservoir of food provided for them in the deep covered litter of an enclosed field, would therefore be erroneous.

No grain exhibits so many varieties, or is so liable to change, as the maize; the preferred spe-

cies can only be preserved or improved by selecting the seed at the time of shucking; this will also prevent its exposure to a sweat, and produce its better vegetation; and it increases the crop, which is deeply influenced by the length of the grain. [Note D.]

PLOUGHING.

This subject has been unavoidably anticipated by its connexion with others, but yet it is not wholly exhausted.

I utterly deny the truth of the theory which asserts that ploughing is a substitute for manure: for though I admit, that the atmosphere is the matrix of manures in all forms, and that deep ploughing will cause the earth to inhale and retain atmospherical manure better than shallow, yet atmosphere being more subtile than water, must be more fleeting; and its properties must of course be elaborated into more permanency than when merely caught by the earth's power of absorption, to perfect their efficacy. Even rain, though richer and grosser, is quickly wasted by evaporation; and atmosphere, a diet too thin for the exclusive sustenance of plants, as is seen in droughts and on all poor soils, cannot be fixed by ploughing, because earth has not the power like vegetables of elaborating it into a lasting form. Plants speedily die in atmosphere and live long in rain or water.

We must avoid the plausible error, that if the atmosphere is the matrix of manure, its inhalation may permanently enrich the earth, and supersede the slow process necessary for its elaboration into the vegetable form for that end. We know that marl possesses the property of permanently enriching itself by fixing the atmospherical fertilizing qualities; but we know also, that such is not the nature of other earths. This natural difference is the reason prescribing different modes for fertilizing marl and such earths, and exploding Tull's exclusive reliance upon the mode by which marl is enriched, for enriching earths of different properties. But yet deep ploughing ought not to be rejected, because although it does not enable earths generally to extract from the atmosphere a sufficiency of its fertilizing qualities to make them rich, yet the portion they do extract, if even as transitory as rain, may still retain a high value among the several agents necessary for producing the most perfect effects of good husbandry.

Lime and gypsum repeatedly applied to land kept in constant culture, without the intervention of vegetable matter, will finally render it barren; but if ploughing was a sufficient substitute for manuring, by absorbing and fixing atmosphere, it would have provided a sufficient quantity of pabulum for these exciters to exercise their power upon, and effectually have prevented the imbecility arising from reiterated exertions, by reiterated supplies.

Plants perish by an overdose of dung or rain, but not by one of atmosphere, because it is sparingly sprinkled with their food, and this food must be collected, condensed and rendered operative, by some process more effectual than the inhalation of atmosphere by the earth; which, alone, will hardly produce more sensible effects than its inhalation by a man as a substitute for a dose of nitre.

The degrees of value in manure probably rise with its permanency, and may be marked, simple atmosphere 1. Rain 2. Green herbs 3. Dung 4. Dry herbs 5. Wood 6. If the reader should place a large decaying trunk of a tree mostly under ground, and manure a spot of earth with a different substance of equal weight, he would discover which would longest preserve the land in heart.

Tull's theory, "culture without manure," has hitherto been the practice of the southern states, with this difference, that he ploughed deep, they shallow; but yet the complete destruction of a soil originally good, which it has effected, ought, after two hundred years' experience, to explode so much of it as excludes the necessity of manure. The same shallow ploughing which produced good crops, whilst the land was naturally rich, would produce good crops if it was made artificially rich. The good crops obtained by bad culture from rich land, demonstrates that fertility is the first object to be effected. But whilst this is admitted, the effects of uniting fine tillage with a fertile soil, ought not to be forgotten, by any who possess a taste for excellence or for wealth.

Hence, deep ploughing has been often recommended in these essays, and to these recommendations are added the following remarks:

Deep ploughing upon a naked and poor soil, by which a caput mortuum is brought to the surface, has frequently proved pernicious. This has been owing to a variety of causes, but, among them, the preservation of a flat surface, though least suspected, has probably been the most operative. The simple process of burying under a sterile tegument, the little strength of the land, neither promises nor performs much; but the disappointment of hopes really forlorn, frequently causes us to abandon effort, and embrace despair.

By the system of these essays, inclosing, manuring, and high narrow ridges, are combined with deep ploughing. The two first replenish the earth with a large stock of vegetable matter, and the last has the effect of collecting the existing soil in the centre of the ridge, and depositing the sterile on its two sides, there to remain for above three years, exposed to the action of the atmosphere. Thus all the bad effects of deep ploughing are avoided. Instead of a naked surface, it is applied to one largely replenished with vegetable matter. Instead of forcing the soil and substratum into a topsy-turvy position, it collects and doubles the first for a present crop, and provides for the amelioration of the other, for a future one. It deepens and fructifies the soil, whilst it makes the best provision for present profit. For the reader is to observe that I am speaking of poor lands, whose soils require doubling, for present subsistence, and improving for future comfort; and not of those whose soils cannot be pierced by the plough.

Deep ploughing, (by which I always mean the best to be performed by four good horses in a plough,) combined with inclosing, by turning under a good coat of dry vegetable matter, creates a covered drain, and thus vastly obstructs the formation of gullies in hilly lands, even if fallowed with a level surface. But such lands will admit of narrow ridges as well as level, by a degree of skill and attention so easily attainable, that I observe it to have existed in Scotland above a century past, under a state of agriculture otherwise execrable,

and among the ignorant highlanders. It is effected by carrying the ridges horizontally in such inflections as the hilliness of the ground may require, curved or zig-zag, preserving their breadth. The preservation of the soil is hardly more valuable than that of the rain water in the successive reservoirs thus produced to refresh the thirsty hill sides, instead of its rushing to and poisoning the valleys. This classic system of agriculture has been introduced into Virginia by a gentleman of Albemarle, in a style completely adapted to the nature of the country, and which will be copied by those who shall not be discouraged by its perfection. His ridges however are wide, whereas, in the maize country, they ought not to exceed five or six feet.

If enclosing, manuring, deep and horizontal ploughing were unattended by any other advantages, that of preventing the land from washing away would in many views be a sufficient recommendation of such a system. The disaster is not terminated by the destruction of the soil, the impoverishment of individuals, and transmission of a curse to futurity. Navigation itself is becoming its victim, and in many parts of the United States our agriculture has arrived to the insurpassable state of imperfection, of applying its best soil to the removal of the worst farther from market.

The alternation once every four years between deep furrows and high ridges, according to the recommended mode of cultivating corn, and the deep ploughing, by burying one portion of the garlic very deep, and exposing another to frost, will probably destroy it; a conjecture founded upon its considerable diminution in grounds thus treated.

CULMIFEROUS CROPS.

Among these, wheat is the most valuable, and is exposed to most calamities. These calamities are sometimes the effect of climate, at others of bad tillage, and gradually diminish, as the climate becomes less favorable for Indian corn; for which inconvenience the additional compensation according to the same thermometer is bestowed, of a greater suitability for rye, oats and barley. In the climate and soil proper for maize (I speak generally without regard to exceptions) rye and barley seldom succeed, oats are light and precarious, and wheat is preferable, both on the score of value and risk, to either. There are two calamities only common to wheat, which may not be avoided with certainty; those of the Hessian fly and rust. As to the weevil, they are certainly avoided by getting it out early; a habit which will prevail, so soon as it is discovered, that wheat may be severed from the straw by treading or a machine, with the labor necessary to secure it in stacks or barns. The facility with which the grain then comes out, has enabled me in a dry harvest, to tread an entire considerable crop, almost by the time the harvest ended; and I generally pursue the practice as far as the weather will permit, so as to leave a remnant only in stooks capable of being gotten out so soon after harvest as to avoid this calamity.—The best bread and seed wheat, is invariably that gotten out and cleaned within a day or two after it is cut, and deposited dry, in a dry place, in barrels, hogsheads, or chests opened or closed.

The Hessian fly is so little understood, as to have become an excuse for the loss of crops proceeding from bad tillage. Lands are tired by shallow and incessant culture, or by being prevented from invigorating themselves with vegetable substances. Even the richest bottom lands are subject to weariness, and sometimes are said to have grown lousy, so that they will cease at length to yield good corn; and the crop has the appearance of being infested by insects. To such causes are owing, I think, most of the charges brought against the Hessian fly. They would be removed by manuring, covering the land with good clover lays, and by deep ploughing, in the cultivation of the maize fallow crop or of any other, according to the foregoing system; or by managing naked fallows in the same way. And, moreover, a probability exists that the two deep ploughings, one in the winter and the other early in June, recommended by the same system, might destroy the fly itself in some form, and other insects to great extent. At least my experience has never furnished me with a single instance, in which a crop has suffered by any insect, when the land was in heart and well covered with dry vegetable matter, when that matter was turned under as deep as four horses in a plough could do it, when the land had received a second good ploughing by two horses in a plough, and when the wheat was seeded on high and narrow ridges, with a clean furrow.

The rust, as it is called, may be better understood, because it may be certainly produced, by a due combination of heat, moisture, shallow ploughing, and a flat surface. By this process we shall never fail of obtaining it on a stiff soil, from which the rain water cannot escape, just as by dosing a man with arsenic, we are sure of poisoning him at last. Of course we should no more prescribe this system of agriculture to the wheat, than arsenic to the man, if we do not wish to poison it, although its diet, like that of a man, may disagree with it occasionally, in spite of art and caution. Deep ploughing, high ridging, and deep wide water furrows, constitute a mode of culture the reverse of that which inevitably afflicts wheat with the calamity called the rust, and hence may sometimes prevent, and generally diminish it. The draining of the ridges and the flues, for the transmission of air through the wheat, created by the deep wide furrows, will diminish the heat and moisture, which appear to be the chief causes of the disease; and vigorous roots in a deep tilth may add to the capacity of the plant to resist the malady.

Plastering, by an equal measure of gypsum mixed with it, and moistened, has benefited wheat in sundry experiments, to the conjectured extent of ten per centum, when it has been free from what is called the bird foot clover; and injured it thrice as much, when infested with that grass, owing to the effect of gypsum on its growth, which is such, that this species of clover among the plastered wheat will be three or four fold more luxuriant, than among the adjoining unplastered. But the land is so considerably benefited by this plastering of wheat, that in several instances, I have seen intervals of ten yards wide across large fields, where it was omitted for experiments, exhibiting for several years afterwards a decided inferiority of soil. Besides, it produces the highly valuable

effects of causing the clover seed sown on the surface of the wheat to sprout, grow and stand drought better, and of doubling or trebling its crop the year succeeding the wheat, either for cutting, or for the more beneficial purpose of falling on the land.

To preserve or improve any species of wheat, a selection by hand must be annually made, with which to commence a new stock of seed.

SUCCULENT CROPS.

The trials I have made of this family have resulted in the rejection of the whole, an individual excepted, as possessing but little value, except for culinary purposes; and the remarks I may make, denying them to be objects otherwise valuable, are to be understood as admitting their high usefulness as food for man, in respect to his comfort, to his health and economy. But, pumpkins excepted, none of them have in my experience produced profit, used in any other mode. I have long and patiently persevered in trials of the turnip and potato, according to every mode I could collect from European books. The former are extremely precarious, sown broadcast, and extremely troublesome, drilled, thinned, ploughed and twice hand hoed; a process necessary to obtain a tolerable chance for a great crop. They are a food so little nutritious, that some animals die confined to them, none fatten without an additional food, and all eat an enormous quantity, so as seriously to enhance the labor of feeding. They are great exhausters of land, perhaps the greatest; and so far have I failed in preventing this effect, by taking up the turnips in the fall, that it was quite visible in lands similarly manured adjoining the turnips, both in straight and crooked lines. Nor have I discovered the great benefit said to be experienced in Europe, of feeding the turnips on the ground by sheep in folds removable every twenty-four or forty-eight hours.

The potato is by no means so precarious nor exhausting a crop as the turnip, although it participates in no very small degree of both qualities. The objections to it are the great quantity of seed to an acre necessary to be preserved through the winter, and used in the spring; the tediousness of planting and gathering; and the poorness of the food. Before I had seen Young's experiments, I had found that hogs would die on them, raw or boiled, and ascribed it to the inability of the climate to bring them to perfection; but he proves the fact in England to be the same. It is true that horned cattle will thrive well on a liberal allowance of potatoes, attended plentifully with good hay; but they would thrive on the hay alone, nor do my experiments prove that the potato is the cheapest additional food.

The pumpkin on the contrary, in several respects, seems to me to be preferable to it. The expenses of seed, of planting and of gathering, are very wide apart. The labor of cultivation is nearly the same. The pumpkin crop is less uncertain, and far heavier to an acre. Probably a pound of pumpkin may afford less nutriment than so much potato, but it is invariably healthier, and seldom fails, in combination with Indian corn, to dispose all animals to fatten kindly, and to aid in

advancing this end, so as greatly to diminish the expense. It entirely answers the end of fodder or hay in the fall season, in fattening cattle and sheep, and enables the farmer to spare his stock of both; a circumstance highly beneficial to one who does not abound in those articles, by enabling him to feed his teams better, and to save a sufficiency to allow them enough, from the failure of the clover, until the new crop of hay or fodder comes in. Perhaps no circumstance has contributed more to the impoverishment of several of the United States, than the negligence to provide dry forage for summer, producing the evils of a loss of labor, of weakening the teams, and of ruinous grazing. The pumpkin, with the daily addition of a few corn stalks thrown into the pens, is preferable to the best hay or fodder I ever tried; and it appears to me to be much less of an impoverisher than the potato; arising, I suppose, from its entirely covering the ground about the last of June, if properly cultivated.

My mode of cultivating it is this. I select the intended number of acres in the proposed corn field of the ensuing year, where the land is infested with some plant, proposed to be destroyed by culture for two successive years, and by the impenetrable shade of the pumpkin vine during the first. In the winter the ridges are cleaned by four furrows run as deep as four horses can manage a large plough, throwing one moiety of each into the old water furrow; and I make a new water furrow wide and deep where the centre of the ridge lay. In the latter end of March, as much manure as will make the land rich is spread on, and the ridges are restored by similar four furrows to their first position, agreeing with that of those for the ensuing year's corn field. If the land is stiff, a second ploughing with a small plough may be necessary to pulverize it. The pumpkins are planted in the mode of planting corn, at five feet and a half distance in the direction of the ridges, and two feet nine inches across them. They receive one deep ploughing, the ridges are raised high and the water furrows made deep and wide; the plants whilst tender are defended against a small bug; and the ground is kept clean until the vines begin to overspread it. One plant only is left in a place.

The custom of sprinkling pumpkins over corn fields, scatters the crop so, that the labor of its collection exceeds its value. By giving them more room, the fruit will be larger, but the product less. As soon as they begin to ripen, their use should commence near their residence, to save the labor of a distant removal. In this use they may be made considerably subservient to manuring, by penning the animals fed on them. The remnant must be gathered before frost, and deposited about three feet high in a stack made of corn tops in the common form, convenient to the pumpkins, open at both ends, and their use rapidly continued to avoid risk.

Indian corn, dry or boiled alternately, is the best food to be united with the pumpkins which I have tried. The pumpkins are fed raw, chopped by broad hatchets in troughs, and eaten ravenously. They produce a great saving of grain, and an entire saving of dry forage, a considerable addition to the meat, milk, and butter, and some increase of manure.

LEGUMINOUS CROPS.

Indian corn must be recognized as the prince of this family, if it belongs to it. No individual of the whole tribe can compare with it for meal, malt, fodder, and litter. In England, where sundry of its cognominal relatives are highly celebrated as fallow crops, their chief merit consists in preparing the ground for wheat, or for some other culmiferous crop. It was never imagined, that the least competition as to value existed between the fallow crop and its successor; and the great doubt has been, whether a naked fallow or a fallow crop ought to be preferred. Young decides for the latter, on account of the profit resulting from the succulents or legumes used as fallow crops there; and his arguments are tripled in weight, by the triple value of Indian corn used as a fallow crop here.

It results that I reject the succulents and legumes resorted to in England as fallow crops, and prefer the maize for that purpose; wherefore, in the previous chapter, the first have not been considered in that character, nor will the latter be so in this.

But I shall advert to legumes as a valuable food for man, not sufficiently attended to, whilst I admit that in every other view, including the danger of destruction from accident, they are inferior to maize; and that even in this, they are rather to be considered as its coadjutor than rival.

Among them, the pea is selected as covering most individuals, and most fitted to our climate. Four gallons of dry peas annually, will add inconceivably to the health, strength and comfort of a laborer, if prepared by good boiling with salt meat of any kind. The ruinous state of our country affords but too much space to raise peas without much expense of skill or labor. In the shifts of most of our farms there is no scarcity of poor land. Such ought never to be sown with wheat or any other culmiferous grain, because they will produce no profit, and because severe exhausters as they are must be excluded from land already exhausted, under any system of agriculture which meditates its improvement. A portion of such land may be selected, sufficient to produce four gallons of dry peas for each resident on the farm of all ages, exclusive of what they may gather and use at their will in a green state, to be planted among corn at the distance of five feet and a half square, the distance also of the corn. Of this, one stalk only is left in each bill. The ground is ridged, ploughed but one way, and both crops are planted in the direction of the ridges. It remains without producing any other crop (these two excepted growing together) inclosed, ungrazed, in deep furrows and high ridges running north and south, until the revolution of the course of culture, which consists of four years, is completed; and is very much improved. It is more so if aided by a bushel of gypsum to the acre. This poor land thus treated, is rendered more productive than as usually managed, and the object of its improvement is accelerated by such a culture beyond what would be obtained by a state of perfect idleness.

If circumstances prevent this course, the peas are raised in the same mode with pumpkins on a portion of the intended corn field of the following year, where noxious plants are to be eradicated,

equally enriched, and similarly cultivated; except that the labor is very much lessened by the use of a weeding plough called a skimmer. They are drilled by the hand as thick as the common garden pea, in a shallow furrow on the summit of the ridges, and covered with the hand hoe. If the land is rich, they will cover the whole ground, so that little is lost by the distance required in reference to the succeeding corn crop; and a small spot of land will produce the necessary quantity.

The best kind of pea for the end in view, (which is extremely important to a well managed farm) known to me, is white with black eyes. But as there are many peas which answer this description, besides a great number of others, the reader must be referred to his own experience or inquiries for the necessary selection.

LIVE STOCK.

Among the queries proposed by the Richmond Society to awaken the dormant science of agriculture, the eighth is so propounded as to admit that which I deny, "that keeping a large stock, and inclosing to improve land by excluding stock, are rival and incompatible systems." I shall therefore consider this admission as a prevalent opinion, which powerfully combats, and extensively retards a system upon which the regeneration of our lands possibly depends.

It must be admitted that keeping a stock, equal at least to the whole grass, produced both by the arable and meadow grounds of the farm, and not the inclosing system, has generally prevailed; and, therefore, as such a stock is not only a large one, but the largest capable of being kept, it follows, that one of the experiments of the proposed comparison, has been completely tried in Virginia.

And what is the result? It is found by computing the consequences reaped by Virginia, from her system of keeping these enormous stocks; enormous in proportion to their food. She exports neither meat, butter nor cheese. She is unable to raise as much of either as she consumes. She cannot breed a sufficiency of draft animals, for her own use. And after having ruined her lands by grazing, so far from deriving a profit from it, she is obliged to deduct annually a considerable sum from the profits of her agriculture, wretched as it is, to supply the deficiencies of her more wretched system of grazing. If it is a fact, that lands will sink under a system of oppressive taxation by crops, is it not conceivable that they will also sink under excessive grazing? And if by cropping them less, more bread can be raised, may it not follow, that more meat may also be raised by grazing them less? Fertility is as necessary a requisite for raising stocks as for raising bread, and whatever will produce it, is a harbinger of both; a system of grazing, therefore, which impoverishes a country, is as likely to terminate in large stocks, as a system of culture having the same effect, in large crops.

The opinion "that by calling in the aid of inclosing to recover the lost fertility of the country, we must sacrifice our stocks," defeats its own object; stocks depend as intimately upon this recovery, as bread stuff, and are, in fact, unattainable without it, except by a vast depopulation of the

country, to make up the loss of food for stocks, occasioned by the impoverishment of the land, by extending the space of their range.

It was hardly to be expected that a good system of grazing would have been found in union with an execrable system of agriculture, and therefore, instead of inquiring whether we ought to sacrifice our mode of tillage to raising stock, or our mode of raising stock to our mode of tillage; the true question probably is, whether we ought not to abandon both, because both modes obviously impoverish our lands, and gradually diminish both crops and stocks.

In Britain, generally, arable lands are not grazed, though grazing is pursued probably to an injurious excess. There, meadows, natural or artificial, and well turfed standing pastures, are prepared and used for grazing; and if these precautions are useful to a moist climate and a rich soil, they cannot be dispensed with by a dry climate and a poor soil.

To raise large stocks, we must first raise large meadows and rich pastures, defended by a sod both sufficient to withstand the hoof and the tooth, and capable of becoming richer under their attacks. If any local difficulties in effecting this are discerned, they point directly to another view of the subject. Supposing that raising large stocks and enclosing arable lands against grazing, were really incompatible objects, our attention is of course turned towards our climate and soil, for the purpose of making the election; and it is very obvious that a warm dry climate and a sandy soil ought not to make the same choice, with a climate cool and moist, and a clay soil.

Still those who have to struggle with natural disadvantages in raising stocks, will not find them insurmountable, so far as it is their interest to surmount them, if they will resort to the very system for fertilizing their lands, supposed to obstruct the object. This system itself requires strong teams, meat for laborers, and stock sufficient to consume the offal of all the crops. Inclosing is only a coadjutor to manuring, and had it excluded the means for the latter, it would have excluded a more valuable object than itself. So far from it, that it vastly advances those means, by a regular, and ultimately a great increase of crops, and consequently of litter, offal and stocks.

Suppose a farm under the system recommended in these essays, to have trebled its crops on the same fields in twelve years—if the whole additional crop thus gained was devoted to stocks, is it not certain that it would support far greater, than the same farm could do in its grazed state? Is it not obvious that the offal of this treble crop will support a stock three times as large through the winter, as the offal of one third of it; and that the three fold crop of grain will admit of large drafts for the still farther increase of stocks, whilst one-third of such a crop might admit of no such contribution? The supposition is a fact. It may be farther discerned, that as the crops by the acre increase, the space cultivated may be gradually diminished, so as to release a portion of the labor for the purposes of draining, manuring, and raising artificial grasses; and in that view constituting a different mode of providing for stocks, from that of grazing exhausted arable lands. A glance of intellect decides between the two modes.

The grazier and the ploughman are characters

so different, and their occupations so distinct, that had these essays related to a system of grazing, "Pecuaris" ought to have been their signature. What stronger proof can exist of our agricultural ignorance, than a notion of succeeding in both lines at the same time, by respectively violating the first principles of both. To succeed in grazing, it is necessary to cover the land with a strong and rich turf; to succeed in agriculture, this turf must be destroyed. Having destroyed the turf by the plough, we endeavor to prevent its renovation by assailing it with the tooth and the hoof, the instant it germinates; and propose to raise large stocks without grass, and large crops on land too poor to produce it. In England, the ideas of promoting crops by treading and grazing, and grazing by ploughing up pastures and meadows, would excite great admiration; and the general prohibition in leases against the latter, discloses the disapprobation of the system of reaping corn and stocks annually from the same land. The question, whether the business of grazing or of tillage is the most profitable, frequently occurs; but whether the same land ought or ought not to be exposed both to tillage and grazing, is one never made by good husbandmen. In many parts of the United States, the distinction between tillage and grazing is well understood, and their separation beneficially practised; but, in most, sundry circumstances not necessary to be adduced have united these occupations; a union indispensably necessary to a certain extent for tillage, and incapable of being dispensed with. It is therefore necessary for me to prove, that the system of inclosing arable lands, for the purpose of excluding grazing, is not inconsistent with the stocks necessary for meat, labor and manure, beyond which, the occupation of tillage forbids their extension.

If meadows and well turfed pastures, are best for grazing, and if by excluding grazing from arable land, its product is vastly increased, it follows, that we can effect this union not only without injury to either of the objects, but so as to advance the interest of both, by allotting proper portions of the farm to each, and managing such portions according to the principles indispensably dictated by the ends intended to be produced. Whereas, the principle necessary to produce stocks or grain, being not only different, but exactly opposed, since we must produce grass for one end, and destroy it for the other, by applying both to the same land, a warfare ensues which cripples, and finally kills both the combatants.

By thus appropriating particular portions of a farm, we may manage each portion according to the principles necessary to make it more productive; and the productiveness of each will advance that of the other. The better crops of grain we raise, the more offal is produced, and this offal, by furnishing litter and food for stocks, raises stocks sufficient to reduce it to manure; the chief means for improving our pasture, meadow and arable land. An increase of stocks must follow an increase of manure, because it begets an increase of their food and litter, just as their decrease is an inevitable consequence of the diminution of manure.

We see that some of the states, Virginia for instance, can no longer raise meat, cheese or teams sufficient for home consumption, and the cause of

this phenomenon will illustrate my reasoning. No state, and probably no agricultural country, ever went more thoroughly into the plan of grazing arable land, of neglecting meadows and permanent pastures, and of endowing their stocks with the privilege of unlimited grazing; and the end is ruin to the stocks themselves, as a consolation for ruin to the lands. The indiscriminate grazing is the very cause, which is impoverishing both the husbandman and grazier, and the greedy project of succeeding in both characters, by extorting from the earth a double contribution, has defeated our success in either.

Such a project is as fatal to a country, whose climate and soil are not naturally adapted to the production of grass, as an obstinate culture of rice and cotton would be to the state of Massachusetts. If, therefore, we are to be brought to the proposed computation, the election between tillage and stocks is settled by the consideration of soil and climate, as they may be favorable to grass, bread stuff or other products, because, however we may sometimes be able to force nature, her spontaneous efforts on our side are the best sureties for success.

Let any gentleman, for instance, of the bread stuff country of the United States, compare the profit he would derive from doubling his crops of grain, with that he gains by keeping the largest stocks within his power. He will discern, that such an accession of annual income, will generally even exceed the whole value of his stocks, instead of their profit; and if the enclosing system, aided by the means heretofore explained, will rapidly double his crops of grain, the preference between that and its rival is determined; and the object of grazing at the expense of tillage in an impoverished country, ought to be abandoned.

If we impoverish our land by grazing or tillage, both stocks and crops, whatever they be, will gradually diminish; gradually, become less profitable; and, finally, insufficient to afford a maintenance. It is true that some bottom lands exist, so rich, as to bear, and even improve under tillage and grazing, if red clover is the grass used, and if it is suffered to get well in flower before the stocks are turned on it. But this is owing to the extreme fatness of the soil, its ability to cover itself with a luxuriant coat of clover, the accession of vegetable matter by a great portion being trodden on and rejected by the cattle, and the entire acquisition of its tap root, containing from the size it acquires in such land, no inconsiderable quantity of the same matter.—Besides, land of this quality is so rare, as to constitute an anomaly entirely foreign to any system of agriculture proper for the United States. Very few of us have ever seen it, and still fewer would profit from any system built upon its qualities. Nay, it is a kind of land which hardly requires a system, and would be as prosperous under a bad one, as the general agricultural state of the country would be under the best. It is necessary however to suggest this anomalous case, lest we should be led to reason from it, for the purpose of deciding a different case. The most zealous *amor patriæ* will confess that the United States have infinitely less need for a system to improve rich than for one to improve poor land; and instead of being blinded by its wishes should be enlightened by truth, as the only

mode of gratifying one of the most amiable of human passions.

The expanse of our territory, generally, is now in a state so far from being able to improve under the double taxation of tillage and grazing, as to require a revolution of our habits to improve under either; and the time has come, when it is equally necessary to discover some mode of raising meat as well as bread, without impoverishing our lands.

It is easy by a good system so wonderfully to alter the case, as to make stocks profitable simply from their manure, exclusive of the labor, meat, tallow, leather, milk and butter they yield; and to draw from them not only the entire means for their own support, but a surplus for enriching the soil. The mode of doing this has been heretofore explained, but in order to combine with it the subject now under consideration, with more perspicuity, I will take up and consider separately, the mode of managing each species of our domestic animals, usually comprised by the term "stock," upon a tillage farm which requires the nurture of inclosing.

The working animals constitute a species of stock comprising horses, mules and oxen. The two former ought to inhabit a lot having a stable and stream, and to be excluded wholly from grazing. For two months of the year, clover cut daily, and exposed to six hours' sun, to prevent the animal from being hoven, should be their hay. It will add to their health at the season it comes in. After it fails, the best fodder or hay, preserved for the hottest season, succeeds it. Corn stalks serve them from the first of November, whilst they last, and are succeeded by the inferior tops, blades or hay. By littering the stables and yards well in winter, they will make manure sufficing to enrich more land than will produce their corn; as this enrichment is not exhausted by one crop; and as clover, proper cultivation, and inclosing will preserve and farther improve the land, the working stock, exclusive of its labor, subscribes largely to the renovation of the soil instead of its impoverishment by pasturing. The considerations of saving the labor of collecting the working animals from pastures, and avoiding the loss of the morning, so material in a warm climate, are inferior, but additional recommendations of the same system.

The oxen in summer should be penned and fed separately from the other cattle, and in winter the same separation should take place, with a more comfortable cover. They will furnish the same supply of manure as the horses and mules in winter, and more in summer from the removal of their pen, calculated to stand not beyond ten days. Whilst not at work, they may be pastured with the other cattle.

The horned cattle are happily able to encounter the hardships inflicted on them by the impoverishment of our country. These will be gradually decreased by enriching it. Their food for half the year consists of the coarse offal of bread grain in much of the greater portion of the United States, and a system which will increase such crops, will increase their food during that season of the year, when they suffer most, and perish in great numbers, besides affording them a chance from its greater plenty, of participating more copiously of the grain itself. Such an increase of staple crops begets capital and releases labor, for draining im-

provements; and speedily points at swamps and marshes of a soil, capable in general of being made one hundred fold more productive in grass, than our exhausted fields. Meadows thus grow out of the inclosing system, if that system increases the staple crops, and are a retribution with accumulating interests to the stock, for the loss of naked fields. This retribution extends to both fall and winter. Meadows should be cut for hay, and grazed with horned cattle, after the second crop has arrived to its most luxuriant state. So far from being deteriorated by it, they are improved, produce cleaner and larger crops of hay, are longer defended against the intrusion of weeds, bushes and coarse grasses, and finally, when tillage becomes necessary for cleansing them, their state for receiving it will be better, and the crop enhanced.

By the increased offal of increased crops, and by the hay of these meadows, stocks will be better provided for during the winter, than under the unlimited grazing system; to which add the grazing of the aftermath of the meadows, and this superior provision is extended to about eight months of the year. Between three and four months of spring and summer, pasturage only remains to be supplied. An abundant resource for this is one effect of unlimited grazing, and our greatest agrarian calamity. Vast tracts of exhausted country are every where turned out, or left unenclosed, to recover what heart they can in their own way; and their progress in that effort is accelerated by inclosing them as pasturage for cattle alone, or at least excluding hogs. Such fields presently produce shrubs and coarse grass, and lands never cleared, may be inclosed with them, as auxiliaries. Together, they will constitute a pasture for cattle, far better in the spring and summer, than that generally afforded by arable lands, which in the maize country of the United States are particularly scanty of grass until towards the fall, and then the superior resource of the meadow grazing is provided by the system of inclosing.

It would be too alarming, to subjoin to these reasonings (and probably by its strangeness might destroy them all) the idea of manuring a spacious highland meadow, as a farther auxiliary to the inclosing system; and therefore it will be deferred until crops are trebled by it. But it is indispensably necessary to point out in what way this system is prepared to satisfy those cravings which cannot be deferred.

As crops increase in a warm and poor country, no department will more suddenly experience an improvement than that of the table. As to beef, it is received from the aftermath of the meadow, by the pumpkin, and Indian corn, the corn stalks succeed the pumpkins, and it is finished in March on corn and hay. In the interim the knife is at work and the manure is accumulating. During the moderate weather, after leaving the meadow, for the pumpkins, the bees are penned on successive spots and not littered, the plough succeeding the removal of the pen. When the stocks come in they are placed in their stationary winter's habitation, and copiously littered. And with proper management, the manure thus raised overpays the expense of fattening them. The additional advantage of milk and butter is derived from fattening for beef the old cows yielding milk,

through the winter. They may be often made fine meat, and will at least be a valuable acquisition to the stock of salt provision for the laborers, instead of being devoted to their common fate in a premature age, by want of food.

The best and cheapest mode of raising calves, and of fattening lambs, I have ever tried, is also suggested by the inclosing system. It is that of folding them on red clover from about the twentieth of April, or from the clover's becoming three or four inches high; the calves until frost. Small common fence rails, and the common crooked fences, make folds with less labor and stand better than any I have ever tried. This pen ought never to stand longer than three days, in which time it ought to be grazed clean. If it stands longer, the grass is injured by treading. When it is to be removed, the calves and sheep are confined in a corner next to the new pen, by using some of the top rails. An acre of fine clover, unless it is disabled by drought, will graze ten calves, ten ewes and ten lambs, through the grass season, allowing for the gradual removal of the sheep, all of which ought to be killed. To make them good meat, they must be allowed other food. Wash of corn meal, or well boiled corn itself, is the best and cheapest I have tried. The acre will be frequently fed over without destroying the clover, and the land will be improved. Calves will make a reimbursement with a profit for this mode of raising them, by their superior value beyond those raised in the common way, and by surrendering at an early age their mother's milk. And its economy is increased by selecting annually the old ewes and their lambs for fattening, comprising so many as that a portion of the latter and all the former may be bestowed on the slaves. By harvest, lambs have grown too large and coarse for the table, and the ewes have become good mutton. The mother should die within three days of the lamb, or she falls off. Both furnish a supply of excellent food at that laborious season; and as to have good lambs we must make their mothers fat, the luxury of the master bestows a luxury on the slaves, without an additional expense, and undoubtedly with more economy, than to devote such sheep to their usual destiny. These old ewes thus managed, yield fine lambs, much wool, good mutton, and hides able to bear tanning for the purpose of making pads for the back bands of the plough horses to pass through.

SHEEP.

It is with reluctance that I am about to express my opinions as to this stock, lest they may discredit those upon subjects concerning which I have had more experience. For sixteen years I have labored to estimate their value and character, upon a small scale, having a flock only of from one to four hundred, daily attended by a shepherd, and my conclusions are that they require and consume far more food, in proportion to their size, than any other stock, that they are more liable to disease and death, and that they cannot be made a profitable object, throughout the whole extent of the warm dry climate and sandy soil of the United States, but by banishing tillage from vast tracts of country. These opinions are by no means intended

however to exclude them as a luxury for the table, capable of being made to repay a considerable portion of the expense it causes.

It is probable that the hot constitution of sheep produces a rapid digestion, and that insatiable appetite, by which the fact is accounted for, of their flourishing only to any extent in fine meadows or extensive wildernesses. If this voraciousness is not gratified, the animal perishes or dwindles; if it is, he depopulates the country he inhabits. The sheep of Spain have probably kept out of existence, or sent out of it, more people than the wild beasts of the earth have destroyed from the creation; and those of England may have caused a greater depopulation, than all her extravagant wars. It may be owing to this animal that the independence of one country is almost overthrown, and of the other tottering. In both countries the sufficiency of bread for sheep, may have produced this insufficiency of bread for man, and prejudice may have nurtured errors, of which our folly may relieve them, just as superstition has been known to seize or steal an idol, which had long been a curse to the place of its invention. It is admitted that the wool of sheep is to a certain extent a necessary, and often a luxury; but if I fancied a pearl, why should I dive for it myself, when those who love the employment, wish to supply me; or why should a nation depopulate itself to gain them, if it can become strong and populous without pearls? The earth's capacity to produce food and materials for clothes is limited, and by endowing the brute creation with so much of the former, as to produce a deficit for man's use, in order to obtain a surplus of the latter for exportation, the sheep policy is said to be perfected. It is probable that an acre of the proper soil in the proper climate, is capable of raising ten times as much cotton wool, as sheep's, and if we shall only glance at the vast quantity of the former material for clothing exported from a small district of country, thinly peopled, we shall at once see the capacity of the earth to produce it to any needful extent without paying depopulation for raiment. Although sheep's wool was the best resource for a state of ignorance, it is superseded to a great extent by a state of cotton manufacturing skill; and whilst the English nation have proved the high value of our cotton, and opened an inexhaustible demand for the abundance we can spare, it is certainly a responsible hostage for the small portion of her woollens we may want; and an exchange is probably better than turning our corn fields into sheep pastures. It is exactly the case in which commerce renders a mutual benefit, as we under our warm and dry climate, and in our sandy soil, can raise cotton cheaper than England; and she by the help of her moisture and verdure, can raise wool cheaper than the United States. It is curious that wool should be supplanting cotton here, whilst cotton is supplanting wool in Europe; but as fashions wear out in one country they flee to another.

Their manure is the chief recompense for the expense of sheep, and worth more than their wool, if they are regularly penned. It is true, that this will in some degree injure them, but it is indispensable, unless by surrendering to them a power of grazing at will, the calamitous alternative of speedily reducing the farm to a barren is resorted to.

Moveable pens, as in the case of cattle, are best in the warm seasons of the year; in the cold, a farm-pen shelter also, open to the south, and closed to the ground towards the other three cardinal points, will suffice to the 39th degree of north latitude. This pen should be regularly littered with stalks, straw or litter of any kind.

Under the system of inclosing, the sheep may be managed like horned cattle, except that they must be better fed. For this purpose they ought to be attended by a shepherd, that besides the grazing allowed to the cattle, they may be treated with such parts of the inclosed area, as they may benefit or not injure. Of the first description, are grounds infested with garlic, over which the sheep should be rapidly carried after it has headed, to eat its seed; of the second, the banks of rivers, rivulets of woodland. In winter, the sheep will eat every thing, and the better the food the more they will thrive. A great quantity of corn, caught soft by frost, most of which became quite black, and all of it such as to be refused by hogs, was greedily eaten by sheep; and the supply being copious, made the best flock I ever saw. In winter, their farm pen is made in the field to be cultivated in corn, the following summer, in which field the sheep are then allowed daily to feed under the superintendence of the shepherd. Being covered with the dry litter of clover, the little grass they get under it is of some service to them, and the litter itself is more conveniently disposed for the plough by being trodden down.

HOGS.

Few animals do us more real mischief, and suffer more unmerited reproach than these. They are the cause of dead wood fences, which render more labor unproductive, than any item of the long agricultural catalogue of practices, portrayed in the miserable countenance of our country. A consumption of labor in making ephemeral fences, which might be employed in making food, clothing or lasting improvements, is a check upon population even greater than the English and Spanish sheep system; but if we add to it, the impoverishment of land, and waste of herbage, by the eradicating license legally conferred on hogs, it will require but a small portion of prophetic skill to anticipate the impeachment of our agricultural system, to be gradually pronounced by the census. We shall however long struggle against the admonitions of this unerring logician, by assigning to the allurements of a wilderness, emigrations resulting from a policy and a system, incapable of withstanding these allurements, compared with all the benefits of our cultivation. Our system of agriculture is felt as a greater evil than no system. A country wanting people with actual tillage on its side, is robbed of a great portion of the few it has, by one exposed to every evil except our agricultural system. But we ascribe the expulsions caused by its impoverishment to the attractions of putrefying forests, of an exposure to all weather, of innumerable hardships, and of Indian scalping knives, and lose the faculty of seeing their cause where we tread, by ascribing it to imaginary notions.

The destruction of wood and timber, produced

by the mode of raising hogs according to law, exclusive of the depopulation it advances, is itself a calamity grievous in all quarters, but ruinous to those unpossessed of coal for fuel, and stone for fencing. This destruction increases in a ratio correspondent to the diminution of our means to bear it; because the young wood and timber used for fences, fuel and building, is more subject to decay than the old; and a perseverance in prejudice cannot be more amply displayed, than by an expectation of resisting with tender saplings, a practice which has demolished the tough forests of oak.

All the calamities arising from fences of dead wood, are ascribed to these ill-fated animals, as if they had themselves forced upon us the system which has produced these calamities; just as the impoverishment of our lands is ascribed to Indian corn, as if that had dictated the system of agriculture by which it is effected. But it is neither new, nor unnatural, to mistake our best benefactors for our worst enemies.

Yet a single question refutes the calumny. Did the hogs enact the laws, by which they are turned loose, without rings in the nose, or yokes on the neck to root out the herbage, and assail the inclosures? Had they been legislators, self-interest (allowing them wisdom) would have suggested to them a mode of coming at subsistence, infinitely better than one, by which they are exposed to disasters, hunger, poverty and assassination.

Excluding from the argument all the mischiefs flowing from the system of raising hogs introduced by law, and confining the question simply to the mutual interest of the hog and his owner in the points of comfort, profit and plenty, we gain conviction of its imperfection, by placing it on its strongest ground.

Meat is the end in view. No animal furnishes better than the hog. If there is any other which will furnish more at less expense, in a dry country, or which possesses more congruity with Indian corn, where that is the chief fund for subsistence, it ought to be preferred; if not, the hog deserves more attention than he has hitherto received. In the maize country, the existence of no such animal is admitted, by the general recourse to the hog as the chief resource for meat; and the first question is, whether he is made to answer the purpose for which he has been thus selected.

The fact is too notorious to require proof. The maize Atlantic districts raise an insufficiency of meat for their own consumption, by means of an animal selected on account of his peculiar fitness for the object. A failure in the object with the best means of attaining it, is the strongest evidence of the misapplication of those means.

Though this supply of meat from hogs is insufficient, it is yet considerable, and far exceeding the quantity furnished by all other animals. But it is still considered by a pecuniary computation as an unprofitable business to raise them. If there is any foundation for this opinion, drawn from a computation which excludes all the mischiefs arising from dead fences, it determines the mode of raising them to be exclusively erroneous.

This pecuniary loss must arise from the mode of raising them, in those districts where hogs are the best resource for meat, unless we suppose that nature has treated these districts with such severity, as to provide no animal to supply a moderate comfort, except at an expense which must exclude

a great number of people from its use. And as this supposition cannot be admitted, the evil can only be sought for in this mode, where it will be found in the disasters of the hogs, the inattention of their owners, the badness and insufficiency of their food, and the mean quality of their meat. I shall therefore attempt in the next number, to point out a different one, more profitable to the owner, more comfortable to the animal, and entirely exempt from the ruinous vice of operating as an exclusion of live fences.

No domestic animal multiplies equally, grows as rapidly, is as thrifty, makes as good salt meat, is as hardy, as healthy, as docile, or eats as little in proportion to size as the hog. A mode of raising him which takes advantage of all these qualities, designating him as the best resource for meat, is a subject worthy of particular attention, and would be a great improvement. My experience is inconsiderable, and my knowledge limited in relation to it. But I shall give the result of the former, without deviating into conjecture, or recurring to books. Indeed, as neither distilleries nor dairies constitute any resource for the country within my view, little aid could be extracted from the latter.

Indian corn, clover and pumpkins, are my only resources for raising hogs. They are raised within the inclosure of a farm having no cross fences, regularly confined in a pen of nights, and suffered to run at large in the day, in that portion of the farm designed for Indian corn the succeeding year. The farm is divided into four shifts, the greater part of each being left in red clover after wheat, so that a shift during the last year of its rest is well covered. The injury to clover by hogs from grazing, is infinitely less than that from any other animal. No number necessary for domestic consumption will materially affect the field exposed to grazing in this mode. Twenty sheep would injure it more than a hundred hogs. And to prevent rooting, iron rings of the size and shape of a large one for the finger, are constantly kept in the cartilage of the nose.

Until the pumpkins come in, the hogs subsist by grazing, with an allowance of shattered Indian corn, sufficing to keep the sows having pigs, in tolerable heart; other hogs will become very fat upon the same allowance. As soon as the pumpkins are ripe, the whole family are confined to the pen, and fed with as many as they will eat cut up in troughs, besides a full meal of sound corn daily, raw or boiled as their appetite fluctuates. And those for slaughter are fed with corn about ten days after the pumpkins are expended, to harden and flavor the meat.

By removing the pen with regularity, and ploughing it up, as in the case of cattle, hogs will in my judgment manure land to the value of the whole expense of raising them; and instead of contributing to the ruin of the country by eradicating herbage, and compelling farmers to reject live fences, contribute to its renovation by their manure.

The whole stock exceeding nine months old, except a male and two or three females, is killed annually. If a species is selected which breeds young, and gains its growth quickly, the litters between the first of June and the first of March will furnish an abundance of progeny for the second killing time. Their mothers will make fat and small, and the males fat and large meat for

the first. These pigs are accelerated in growth, by being suffered to share in all the luxuries of the large hogs, unless it may happen to be necessary to wean a litter occasionally, to gain time for recovering the flesh of its mother. And the annual clearance of nearly all the old hogs, is a matter of considerable economy, because the expense is thereby diminished to a great extent, for above half the year, by having young ones only to sustain.

The mischiefs from hogs allowed such license, is the chief objection to be expected to this mode of raising them. I know not of any agricultural, mechanical or scientific object of much value, attainable without effort or skill. Some degree of both, and but a small one, is necessary to avoid this objection. The hogs ought whilst young to be made quite gentle. Pigs are as docile as puppies. They will not be inclined to wander far from their feeding pen in a field of red clover, if care is taken to secure for them an access to water; and a small boy with a whip will find it an easy task to discipline them out of any such inclination. No temptation solicits them at most seasons of the year, and should they occasionally light upon one so irresistible as to render them troublesome, they must be confined in their pen, until it is past, or they are weaned from it.

Hogs are sufficiently hardy to bear the weather without injury, for eight months of the year; a warm cover is necessary for them during the other four. This is easily made and removed by four forks let two feet into the earth, the two in front eight feet, and the two in rear two feet above it, having a secure roof of stalks and straw laid on poles, and the rear and two sides made perfectly close by two courses of rails, one pressing against the forks, and the other against stakes two feet from them all around, with the interval filled tight with straw. The front is open to the south, and a diameter of ten feet each way will form a comfortable cover for a large stock of hogs.

Small warm huts of a similar construction for the separate use of each sow about to pig, in cold weather, is a precaution most useful, and much neglected. Without it, the greater part of the litters will be lost. And such losses diminish considerably the profit arising from a system, an article of which is to compensate by number for the size of hogs brought old to the knife.

The reader will discern, that I consider agriculture as a *felo de se*. As leading herself to the altar, and inflicting her own death, not with the despatch dictated by humanity, even in killing a hog, but by repeated strokes upon every part of her body. By laws of her own making, she has quartered upon herself tribes of factitious capitalists. By laws of her own making, she has adopted the policy of mingling free blacks and slaves, mutually exciting each other to rebellion, teaching one class the trade of living upon herself by theft without labor, and instilling into the other a hatred of her duties. She spontaneously hires overseers, not to improve, but to exhaust her land, with the wisdom of a saint who should expect to advance true religion, by hiring a priesthood to preach and practice idolatry. And she closes her system by a mode of raising hogs, which burdens her defective labor with the incumbrance of dead and decaying fences; which aids the overseers in substituting a wrong for a right culture; and

which has already caused a deficiency of meat, requiring supplies from the western country; supplies destined to fail by an imitation of the system of agriculture, which rendered them necessary.

As these evils, united, are obviously killing our lands, any one will cripple them, and therefore a successful effort to remove any one, is not unimportant. If legislatures should persevere in wounding agriculture by endowing hogs with a right of unlimited emigration, to and fro, and exposing them to the usual consequences of licentiousness, namely, poverty, disease and death; yet agriculture may be so far favored, as to procure some small alleviation of the pains and penalties thus inflicted on her. If hogs were prohibited from going at large, except with a ring in the cartilage of the nose, and a yoke with three projecting wings of six inches long, one at top and one at each side, these pains and penalties would be vastly diminished. The ring, besides putting an end to the eradication of herbage, would counteract the use of the nose as a wedge able to pierce the best live fences, and the wings would powerfully contribute to the same end.

But this remedy would reach a portion only of the evil we are considering, and will leave in full operation the present expensive and insufficient mode of raising meat. By prohibiting hogs from running at large, we should be compelled to recur to a new mode, which might possibly be more adequate to our wants. To form a correct opinion, it behoves us to reflect upon the present mode of raising hogs, and to contrast it with that proposed, or with more promising suggestions. Our subject is closed with a specimen of this mode of reasoning.

By the present mode of raising hogs, vast quantities of wood and timber are annually destroyed; by the proposed, none will be destroyed.

By the present mode, much labor is lost in making mouldering fences; by the proposed, the inhibition on live fences being removed, much will be saved.

By the present mode one half of the pigs and hogs perish, and a considerable portion of the residue are stolen; so that less than half come to the knife; by the proposed, few will perish, fewer will be stolen, and a double supply of meat may be expected.

By the present mode a great proportion of the meat is lean and dry; by the proposed, most of it will be fat and juicy.

By the present mode, corn, generally hard, being chiefly relied on to raise and fatten hogs, much is used and much is wasted; by the proposed, the use of the pumpkins and clover, vastly lessens the use of corn, and diminishes the expense, whilst it increases the meat.

By the present mode, no return for the food is made by the hog, but that of his carcass; by the proposed, he will pay for it, and in my opinion, more than pay for it, by his manure. If this is wholly true, his meat paid for by the present mode at a price so exorbitant, as to induce some farmers to buy, rather than to raise it, will be gotten for nothing; if partially, this single consideration may at least reduce the cost, far below the usual price.

The value of the clover to hogs is demonstrated by the fact, that (sows giving suck excepted) they will thrive and grow on it alone if allowed

to run at large; and yet make but a small impression on the crop. The addition of corn recommended is necessary for these sows, and highly improves the other hogs. It is indispensable to gentle and lure all to the pen at night. Clover cut and given green to hogs in a pen, will be eaten greedily, and yet the hogs will fall off, and would I think finally perish; nor is it by any means so efficacious, united with other food, as if gathered by the animal himself—[Note E.]

SUCCESSION OF CROPS.

This idea, according to the theory of manures advanced in several former numbers of these essays, must contain much error, and all its truth must be limited to the simple facts, that the cultivation of one crop will clean and pulverize the ground for the reception of another, and that some crops will produce these effects better than others, either as requiring more cultivation, like tobacco, as killing grass and weeds by shade, like the pea and pumpkin; or as rendering the earth more friable, like the potato. But an opinion that the earth can be enriched by an annual succession of crops, will blast every hope of its improvement, if this can only be effected by manure; because all will prefer the ease and profit of annual tillage, as a mode of fertilizing the earth, to the labor and delay of resting land, reducing tough swards, and raising and applying manure.

In England, a thorough manuring of ground already rich, every five or six years, is allowed by all authors to be indispensably necessary to fulfil the promises of a succession of crops; what then have we to hope from a succession of crops applied to ground already poor without this sexennial manuring? In our gardens a succession of crops is seldom considered as a necessary aid to annual manuring. Draw from the earth as you will, it never fails, if replenished annually with atmospherical matter; let your rotation of crops be what it will, it never lasts, if this replenishment is withheld. Industrious efforts, and not lazy theory, can only save our ruining country.

Trust not to the delusive promises of a rotation of crops for restoring our soil. It will aggravate the evil it pretends to remove. It is a remedy which will be greedily seized upon by the annual prime ministers of a southern farm, whose tenure is precarious, and whose object is sudden income; and they will with joy abandon the labor of manuring and improving for prospective, to gain the bribe of immediate profit.

This disposition is so ruinous already, that I have known an owner with very imperfect management, to manure annually ten times more with equal means at the place of his residence, than on a farm some miles distant entrusted to an overseer. Money wages is one mode of curing an evil sufficient without an ally to ruin our country. But to give this remedy effect, the apocryphal opinion of recovering our lands by a succession of crops, ought to be driven out by the more solid reliance upon manuring and inclosing.

Our funds for manuring are sufficient to employ all our energies, and if our energies were employed sufficiently to exclude all worn out land from cultivation, and to produce the sexennial supply of ma-

nure, without which a rotation of crops will be delusive, and pernicious effects would follow, as far surpassing in usefulness those of mere rotation theory, as the Atlantic ocean surpasses in extent the lake of Geneva. Many of these funds of manure, ready to pay the drafts of industry, have been heretofore noticed; more perhaps are overlooked. They are scattered every where around us; and Providence has blest our shallow soil with a capacity of suddenly throwing up thickets, constituting a bountiful provision for manuring and curing galls and gullies. I have tried this vegetable manure by strewing the whole surface, by packing it green in large furrows and covering it with the plough, by packing it in such furrows in the same state, and leaving it to be covered with the plough three years afterwards, and by covering it as soon as the leaves were perfectly dry, sowing it previously with plaster. Each experiment of which the result is determined, is highly gratifying. The last on nearly a caput mortuum of a galled and gravelly hill side, exhibits good corn planted over the bushes, as soon as they were covered. It is in vain to begin at the wrong end to improve our system of agriculture. Fertility of soil alone can give success to ingenious theories. These applied to barrenness at best resemble only the beautiful calculations of a speculator, who demonstrates a mode of making fifty thousand dollars from a capital of a hundred thousand, to a man worth only a hundred cents. The capital must precede the profit.

Manuring only can recover this capital, so much of which is already wasted by bad husbandry. It is the great object to be impressed, and all its modes should be tried. When that has provided a fund for experiment, and an excitement to ingenuity, by presenting to industry and genius a fertile area, the time will have arrived for exploring the more recondite principles of agriculture, and descending to the diminutives of improvement.

The effect of manuring and inclosing united, in stopping gullies and curing galls, is a hundred fold greater, than the most ingenious mechanical contrivance. Land filled with roots, covered with litter, aided by buried bushes forming covered drains, protected against the wounds of swine and hoofs, and replenished sex-ennially with the coarse manure of the farm and stable yards, will not wash. Under such management, the bottoms of the gullies will throw up a growth capable of arresting whatever matters the waters shall convey from the higher lands, soon become the richest parts of the field, and thenceforth gradually fill up. I have long cultivated considerable gullies created by the three shifts, grazing and unmanuring system, and cured in this mode, which produce the best crops, are secured against washing by their great fertility, and are gradually disappearing by deepening their soil.

A succession of crops is utterly incompetent to the end so necessary to our lands, as it will not produce their renovation; and the portion of truth the theory possesses, if it has any, is so inconsiderable, that it will produce the most ruinous errors, if it leads us to believe, that our efforts to manure them may be safely diminished or superseded, by any rotation of crops, however skillful.

LIVE FENCES.

This subject, so extremely material to a country requiring to be raised from the dead, by vast and repeated doses of the only genuine terrene elixir, certifies in every quarter of the United States, to the scantiness of our agricultural knowledge; and is one of the presages, that it is doomed to live and die an infant. If it is an idiot, its case is hopeless; but if it is only a dunce, it must in time discern the vast saving of labor to be applied to draining and manuring, the vast saving of wood and timber for fuel and building, and the vast accession to arable, by rendering less woodland necessary, as acquisitions arising from live fences.

In the "Memoirs of the Agricultural Society of Philadelphia," several modes of raising live hedges suitable for different soils and climates, are stated and explained. Two volumes of these memoirs have been published, containing more valuable information upon the subject of agriculture, than any native book I have seen; and if we have no relish for the wit, learning and experience, with which they abound, but little good can be expected from these ephemeral essays. To say much upon a subject, copiously handled in a book which every farmer ought to have, would insinuate the existence of a general apathy towards the eminent talents which have presided over, and greatly contributed to its composition; to say nothing, would be a neglect of a subject of the utmost importance.

Several plants are mentioned in these memoirs as proper for making live fences, but I shall confine my observations to one, because my knowledge experimentally, does not extend to the others. The cedar is peculiarly fitted for the purpose, throughout the whole district of the United States. It throws out bows near the ground, pliant and capable of being woven into any form. They gradually however become stiff. Clipping will make cedar hedges extremely thick. No animal will injure them by browsing. Manured and cultivated, they come rapidly to perfection. The plants are frequently to be found in great abundance without the trouble of raising them. As an evergreen they are preferable to deciduous plants; and they live better than any young trees I have ever tried, planted as follows:

From December to the middle of March, the smallest plants are to be taken up in a sod of a square conformable to the size of the spade used, as deep as possible, which sod is to be deposited unbroken in a hole as deep, made by a similar spade; the earth coming out of it being used to fill up the crevices between the sod and the hole for its reception. I plant these cedars on the out and inside of a straight fence, on the ridge of a ditch, the plants in each row being two feet apart both in the direction of and across this ridge; but so that the plants on one side of the fence will be opposite to the centre of the vacancies between those on the other. Each row will be one foot from the fence, so that the top of the ridge will be about eight inches higher than the position of the plants. They should be topped at a foot high, and not suffered to gain above three or four inches yearly in height, such boughs excepted as can be worked into the fence at the ground. Of these great use may be made towards thickening the hedge, by bending them to the ground, and cover-

ing them well with earth in the middle, leaving them growing to the stem, and their extremities exposed. Thus they invariably take root and fill up gaps. If these hedges are cultivated properly, and the land is strong, they will form an elegant live evergreen fence, in a shorter time, than is necessary to raise a thorn fence in England, according to the books.

But will they keep out hogs? I am told by travellers that few or none of the hedges in England will do so. Yet hedges are both the chief agricultural ornament, and most valuable improvement of that well cultivated country. But hogs are not there turned loose by law to assail them. I do however think that a cedar hedge is far more capable of forming a fence against hogs than the thorn, because one, as a tree, will acquire more strength or stubbornness than the other, a shrub, can ever reach; and because the cedar is capable of being worked into a closer texture than the thorn.

Yet the wedge-like snout of the hog, the hardness of his nature, and the toughness of his hide, certainly exhibits him as a dangerous foe to live fences; and the resources of ringing and yoking to control his powers and his disposition, ought to be adverted to, for the sake of an improvement so momentous. These will not shock our prejudices nor violate our habits, and are supported by a consideration of weight, far inferior to the importance of hedging; and yet light as it is, of weight sufficient to justify the recommendation. If hedges are not protected against hogs, at least four rows of plants, and a double width of ridge or bank will be necessary; there must be a double sized ditch to furnish this earth; a double portion of land will be occupied by the hedge and ditch; and more than double labor, owing to the inconvenience arising from great breadth, will be always required to keep the hedge in order. Something less than moieties in all these cases will suffice for hedges capable of fencing out every other animal, if the legal rights of hogs are only modified, and besides, the narrow hedges will be far more beautiful—[Note F.]

ORCHARDS.

In our warm and dry climate, I consider live fences as the matrix for apple orchards. These are the only species of orchards at a distance from cities, capable of producing sufficient profit and comfort, to become a considerable object to a farmer. Distilling from fruit is precarious, troublesome, trifling and out of his province. But the apple will furnish some food for his hogs, a luxury for his family in winter, and a healthy liquor for himself and his laborers all the year. Independent of any surplus of cider he may spare, it is an object of solid profit, and easy acquisition. In the southern states, the premature decay and death of apple trees, is the chief obstacle to its attainment. And this my experience tells me is generally occasioned by a stroke of the sun on the body of the tree. Hedges in a great variety of positions will afford shelter to trees against this stroke.

This conclusion has been drawn from many facts, but a single case only shall be stated. Some

years past the following experiment was tried. An area of above an acre was inclosed by a cedar hedge, in the form of a square, with each side presented to a cardinal point of the compass. Soon after, a young apple orchard was planted on the outside around the hedge three feet from it, and at twenty feet distance between the trees. The hedge shaded the bodies of the trees when it could do so, and has been for some years thick and high. Not a single tree has decayed or died on the north or east side of it, many have on the west, and several on the south; and the general thriftness of the trees on the north and east aspects, greatly exceeds that on the two others.

If the result of this experiment can be depended on, for uniting live fences and orchards, the same culture will answer for both, and a vast saving of trees, a great accession of comforts and profit, and a useful and ornamental border of roads will ensue. The same experiment tends to recommend low or short bodies, as some preservative for fruit trees against strokes of the sun.

Next to this cause of the death of apple trees, the residence under, and subsistence upon the bark of the bodies and roots below the surface of the ground, during winter, of the field rat, has been the most common. The remedy against this animal, perhaps the mole, also and probably against the whole family of insects, is to dig away so much of the earth from the roots near the body, to remain open during the winter, as will make the place too uncomfortable a residence for them, during that season, in which they are most apt to feed on the bark.

A saving of much time and trouble, and an acquisition of sounder trees would result from an easy practice, to which I have of late years conformed. By earthing up the young grafts gradually as they grow, to about six inches above the junction of the slip and the stalk, roots will invariably shoot out above this junction, and by cutting off the stalk just above it, when the young tree is transplanted, you get rid of the defects in its constitution, sometimes occasioned by the operation of engrafting, and what is infinitely more important, all the scions sprouting up from its roots, during the whole life of the tree, will be of the true fruit, and furnish spontaneously and permanently healthier orchards, than can be obtained by the labor and art of engrafting.

Good cider would be a national saving of wealth, by expelling foreign liquors; and of life, by expelling the use of ardent spirits. The cider counties of England are said to exhibit the healthiest population of the kingdom. Even hard cider would be a useful beverage to our slaves. Reduced to vinegar it is considered as a luxury, and allowed to be wholesome. But the extreme ignorance of mankind in making cider is demonstrated, by an uncertainty whether the manufacture shall turn out to be sweet, hard or sour. It often happens that things of most value are not perfected, because perfection is easily attainable. A thousand times more ingenuity has been expended on steam engines, than would have sufficed for discovering the best modes of agriculture; and the art of making cider is in its infancy, whilst that of making wine has been brought to maturity. Yet the former liquor would furnish infinitely more comfort, at infinitely less expense to mankind, than the latter, if the art of making it had been equally perfected.

It is probable that a similarity exists in the best process for making both liquors, and that useful hints may be collected from the details, as to wine, towards forming a process for making cider. From this source I have extracted a practice, though undoubtedly imperfect, yet tolerably sufficient for family purposes. It is this:

When the fermentation of the must is half over, so that it is considerably sweeter than it ought to remain, it is drawn off (throwing away the sediment at the bottom of the cask) and boiled moderately about one hour in a copper, during which the impurities rising to the top are taken off by a skimmer with holes in it, to let the cider through. Twelve eggs for each thirty-three gallons, yolks and whites, are beat up, pouring gently to them some of the boiling cider, until the mixture amounts to about a gallon. This mixture is gradually poured into the boiling cider and well mixed with it by stirring. It then boils gently five minutes longer, when it is returned hot into the cask. In eight or ten days it is drawn off, leaving the sediment to be thrown away, and put into a clean cask, with six quarts of rum or brandy to thirty-three gallons. The cask is made completely full and stopped close. For this purpose a sufficient provision of cider must be made. The cider is bottled in the spring.

The chief object in making cider, must be the management of the fermentation, so as to avail ourselves of the spirituous, and avoid the acetous. In the fall it is accomplished by the above process. But cider is subject to a second fermentation in the spring, like wine, which often demolishes bottles or ends in acidity. To manage this so as to make it keep good in casks is an object highly desirable, but which I have not attempted to accomplish. Perhaps it is attainable by racking it off in the spring and making a second addition of spirit. The simple process above stated will carry it well through the winter, and furnish good bottled cider; but it promises nothing more. By cutting off the corks even with the bottle, and dipping its mouth in boiling pitch, it is as completely closed, as the best waxed bottled claret or Burgundy.

DRAINING.

Prejudices have assailed, and will continue to assail, every species of improvement, and theory, instead of experience, will often sow opinion. It is frequently believed that draining, clearing and reducing to cultivation marshes, bogs and swamps will add to the insalubrity of the air, because vegetables feed upon certain qualities of it, unfit for animal respiration; and thus render it purer for that purpose. But why should we load the atmosphere with poison, because vegetables will absorb a portion of it? Countries kept damp by endless forests, though abounding in the utmost degree with these absorbents of atmospherical miasma, are peculiarly unwholesome; and first settlers unexceptionably become victims to the fact. It proves that the air may be contaminated beyond the purifying power of an entire vegetable wilderness, and that a reliance for its salubrity upon the eaters of poison, would be equivalent to a reliance upon the eaters of carrion for its purification.

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If shambles were as extensive as bogs. After having made the air as pure as possible by every means in our power, the vegetable chemistry by absorption, is a means provided by Providence, for its last filter; but to infer from this natural operation, that our efforts to render it purer by draining are pernicious, would be an equivalent inference to the idea, that the cultivation of the earth is pernicious because it is capable of spontaneous productions.

Campania, and some other flat and marshy districts of Italy, are recorded in history as having been made so healthy and delightful in the flourishing period of the Roman empire, by draining, as to have been selected by the opulent for country retirement, and splendid palaces. The drains neglected by the barbarous conquerors of Italy, have never been re-established by its modern inhabitants; and the swamps and marshes have restored to these districts an uninhabitable atmosphere, by having their waters, their trees, and their verdure restored to them.

As new countries are cleared and ploughed they become more healthy. The draining effects of these two operations exceed those of any other, and by drying the earth very extensively, furnish the strongest evidence for ascertaining the effects of draining wetter lands. If the healthiness of a country is increased by these modes of draining, it will not be diminished by auxiliary modes.

The connexion between draining or drying the earth, and human subsistence, furnishes a kind of argument, neither logical nor demonstrative, and yet of conclusive force to my mind. Can it be believed that the author of creation, has committed the egregious blunder, of exposing man to the alternative of eating bad food, or of breathing bad air? If not, draining, whether by the sun, the plough or the spade, being indispensable to avoid the first, cannot wreck him on the second evil.

From the great improvement made in the health of the eastern parts of the union, if we may trust in recent history, by opening the lands to the sun, and with the plough, I long since concluded, that this improvement would be vastly extended by resorting to every other species of draining. And having removed some years past to a farm, reported to be extremely liable to bilious fevers, I threw several small streams into deep ditches, dried a wet road leading to the house, by open or covered drains, and cleared and drained some acres of springy swamp, closely covered with swamp wood, lying four or five hundred yards south of the house. The multitude of springs in this swamp, made deep, central, and double lateral ditches, entering into it every six yards, necessary throughout the ground. The labor was great, but the wet thicket is now a clean dry meadow. Perhaps an attachment to a theory may have caused me to imagine, that the improvement in the healthiness of my family and the draining improvements have kept pace with each other; but I am under no delusion in asserting, that the healthiness of no part of the world, according to the tables of mortality which I have seen, has equalled it.

A very large proportion of the country on the eastern waters consists of level land, swamps, bogs and marshes. The first is chiefly cleared and exhausted; the two last are chiefly in a natural state; and all generate poison for want of

proper draining by the plough, by ditches, and by dams, instead of producing the richest crops of every kind for man and beast, of any other part of the country, without infecting the air.

The swamps, bogs and marshes constitute one of our best resources for recovering the exhausted high lands, as furnishing employment for labor, and funds for manure; to the farmer, they offer a certainty of profit, in exchange for the frequency of loss; and to the worn out land, an intermission of its tortures, and a cure for its wounds.

If the bounties of draining include an improvement in salubrity, in subsistence, in profit, and of exhausted lands, they ought to excite an ardor which will presently leave behind the few and plain remarks which I shall make upon the subject; or at least to awaken great districts of country to the facts, that their best lands, those capable of yielding the most profit, if not those, only capable of yielding any or much profit; lands able to support more people than those at present under culture lie wholly useless; except it may be useful to kill people who are employed in killing land, and thus shelter the survivors in some measure against the evils of penury.

The simplest mode of draining is by the plough, and yet even this is rare. Considerable districts of flat, stiff and close land, are soured by stagnant water and baked by the sun, for want of this plain operation; so as to increase labor, diminish crops and taint the air. Sometimes this rigid land, though intended for Indian corn, is left unbroken through the winter, and retains its excessive moisture, for want of a declivity to discharge it; at others being fallowed level, the water becomes a menstruum for melting down the soil into a brick-like cover, which is generally rendered excessively hard by the sun, before the water is evaporated sufficiently to admit the plough. If the glutinous quality of water had not been demonstrated in the familiar operation of brick making, it ought to have been instantly perceived in the case under consideration. This soil holds it upon the surface with such surprising retentiveness, as often to show it in a rut or some other small aperture, at a time when the crop is suffering by drought. Being naturally adapted to extract and retain the gluten in water, a surface is formed which obstructs absorption, and suspends the water excessively exposed to evaporation; so that the crops suffer more than those of any other kinds of land, both from its excess and deficiency, under the flat culture habit.

For both these misfortunes, draining is the only remedy, and in most cases it can be effected by the plough. This will make ridges and furrows, differing in their level in proportion to the breadth of the former. The wider the ridge, the deeper the furrow may be made; and in ridges calculated for Indian corn, of five feet and a half wide, the bottom of the furrow may easily be made fifteen inches lower than the top of the ridge. Land of the nature described, from the worst, is capable by skilful plough-drainings, of being converted into the best of our soils. If a habit had existed of draining wet meadow lands, first by cutting lines of ditches from north to south over the whole surface of the meadow, and then by filling them all up, in cutting the same number from east to west, and so cutting and filling ditches alternately; all the argument in favor of this

mode of draining meadows, would apply against the only practicable mode of draining corn-fields by the plough; for the latter object can only be effected by abolishing the habit of cross ploughing.

The difference of the level between the ridge and the furrow, in almost every case, enables us to seize upon some descent in the field (as the smallest will suffice) by which to dispose of the superfluous moisture. However distant, a descent comes at last, and adjoining land-holders would find a mutual benefit by uniting in the operation, because stagnant water on the higher field, does an injury to the lower, only capable of being removed by allowing it a passage.

Supposing however the unusual case of a perfect level, essential benefit will yet accrue from the proposed mode of draining by the plough. The climate of the country under consideration is by no means a wet one, and therefore, even in this case, an instance would rarely happen of a fall of rain so excessive as to drench the earth, fill the proposed furrows, and overflow the ridges; because the earth of these ridges having been retrieved from a saturation of moisture, keeping it in winter constantly unsusceptible of an addition, and having been rendered friable by lying in ridges exposed to frost, will absorb infinitely more than the same earth in its flat compact state; because the deep furrows having passed below the crust caused by the union between the earth of the surface, and the gluiness of the water, will thereby have opened new channels for absorption; and because the capacity of the furrows if properly constructed will generally or invariably be adequate to the quantity of superfluous water.

An infallible mode however of perfecting the operation of draining by the plough, exists in sub-joining to it a dry ditch, which in no case need be above eighteen inches deep, and twenty-four wide, to be placed on the side of the field most proper for conveying off the water. If there is any descent, this ditch must run at its foot; if none, it must receive the water nearest to some descent, to which the ditch must be continued. In both cases every furrow of the field must deliver its water into the ditch.

Those readers who have seen large flats of close, wet land on the eastern water courses, employed in killing teams, poisoning the air, and disappointing the hopes of the husbandman, will not consider the suggestions of this number as useless. Our agriculture is hardly prepared for the plainest improvements, and an attempt to introduce those of a complicated nature, would of course be unsuccessful. The double paradox however contended for, having been the result of experience, may safely be referred to the same tribunal, with a word or two to solicit a fair trial. It is asserted that the flat surface in the kind of soil I have been speaking of, will produce the evils, both of too much and too little moisture; and that the high ridges and deep furrows earnestly recommended, will prevent both. In addition to the previous observations in this number, applying to the reconciliation of these apparent contradictions, the reader will be pleased to recollect those in a former one, designed to prove that evaporation will be greater from a flat than from a ridged surface, and therefore in winter, when it is too slow, the furrows may carry off the superfluous water,

and in summer, when it is too rapid, the ridges may obstruct it.

If twenty inches of rain fall in the year, which would retain moisture in droughts longest, a level iron pan of a hundred acres area, or a hundred acres of earth of a soil absorbing all that fell? The soil I have been speaking of, flat and undrained, is somewhat of the nature of the pan; drained by ridges and deep furrows, it is converted into one more absorbent.

The next species of draining to be considered is nearly as simple, as useful, and as much neglected, as that we have just passed. A great part of the country below the mountains is of a sandy soil, and abounds with a multitude of creeks, bogs, rivulets, generally furnishing fine land up to their very springs, if they were drained. But instead of doing this, the labor of the country has been applied with great perseverance and success, to draining the hills of their barren sands, for the purpose of pouring them upon these rich valleys. To arrest and repair so ruinous an evil, would be the means of bringing under culture an immense body of land, infinitely more fertile than that in cultivation; and if health and plenty are bad motives for the undertaking, this fertility ought to suggest the folly of neglecting the smallest slip of these wet lands, from pecuniary considerations only.

If however the wonderful manner in which the eastern states are watered is adverted to, the very great quantity of these wet lands will strike the mind, and disclose to it at once a capacity as great for causing unhealthiness, as for producing profit; and as in reaping the good we remove the evil, an admiration of human nature is awakened, when we see it brave the worst climates, and court death abroad for the sake of wealth, rather than acquire it at home by highly improving a tolerable one, and courting long life.

There is hardly a habitation in most of the eastern states, however distant from the larger rivers, without the atmospherical influence of this vast mass of creeks, bogs and rivulets; and accordingly their effect is almost every where, in some degree, experienced. Few of their channels retain any appearance of their natural state, being every where obstructed by sands, bogs, bushes and rubbish, so as to form innumerable putrid puddles, pools and bogs, upon the occurrence of every drought; to several of which, all our summers and autumns are liable. By stopping and spreading the waters of our creeks and rivulets, they soon cease to flow in droughts, and the water which might be carried off in a healthy current at all times, in wet seasons, poisons the earth, and in dry, the air, because then evaporation becomes its only channel.

Every rational being will acknowledge, that nothing can be more ridiculous than to kill ourselves for the sake of remaining poor, and nothing wiser than to lengthen our lives for the sake of becoming daily more comfortable. The latter objects will both be certainly accomplished by draining our creeks, rivulets and bogs, so as to bestow on them unobstructed currents, and to cultivate their borders. In sandy countries, where they are most extensive, valuable and pernicious, their last quality is most easily removed, as I shall endeavor to show.

Side and straight ditches, where ditching is necessary, ought generally to be abandoned, and

the stream trained nearly to its natural course, avoiding acute angles, and aiming at gentle sinuities. The loose texture of a sandy soil suggests these precautions. In consequence of it, side ditches are speedily filled up. Straight ditches give an impetus to the current, exposing a crumbling soil to a constant abrasion, and devoting the point upon which it expends its greatest fury to great injury. Acute angles create strong currents and are unable to withstand weak ones. The lowest ground is naturally the best for drains. And gentle bends check the impetuosity of currents. From adhering to the lowest ground or natural course of the stream, we may avail ourselves to great extent of the stream itself towards perfecting the drain, by periodically removing such obstructions as it is unable to remove, or discloses in cutting a ditch for itself. These in the sandy countries consist generally of old wood, occasionally of veins of some more rigid species of earth; the first to be removed, the latter to be cut through. In cutting ditches, widening channels, paring off points, cleaning and deepening drains of any kind, one of the most obvious, and most common errors, is to leave the earth on their borders, so as to dam out a considerable portion of the water the drain was intended to receive, and to destroy all the crop within its influence. This earth ought unexceptionably to be employed in curing hollows, leaving the edges of the drain every where lower than the adjacent ground. By this means floods will seldom occur, and more rapidly return to the channel; because as the water is every where trickling into the drain as the rain falls, it has more time to dispose of it, and for the same reason, an excess will sooner be reduced. Both the rapid and complete reduction of floods is of great importance to crops, few of which will sustain much injury from a very short immersion. They are ruined for want of a remedy against stagnant water. Drains in the lowest ground, with edges lower than the ground designed to be dried, aided by ridges and furrows, emptying into the drains, will afford this remedy, in the most perfect manner.

As all our streams have others falling into them, and are attended with a multitude of springs breaking out at the termination of the high land, some substitute for the side ditches, so unsuccessfully tried for the purpose of intercepting these rills and springs, is indispensable. I have tried three with entire success, at an expense of labor infinitely less than that so frequently lost by adhering to side ditches, in such cases as we are considering. If the tributary stream rises beyond the ground we are draining, it is managed by the same principles as the chief stream, so far upwards as is necessary. If it rises in a bold spring at the junction of the hills with the flat we are reclaiming, a channel is made for it in the lowest ground, and by the shortest distance, to the central drain, as narrow as the spade will allow, never more than eighteen inches deep, with perpendicular sides, which in these narrow cuts last much longer than slopes, because they are not equally exposed to frosts. If springs ooze in a continued line at the junction of the hill and flat, a side cut as narrow as possible and deep enough to intersect them all, with a direct cut as above to the main drain, is one remedy. The labor of these cuts is trifling. The last, however, like all ditches

above the lowest ground in sandy soils, is liable to be filled up. To obviate this inconvenience (which in these small cuts is not very great) I have frequently tried covered drains, constructed as follows, with invariable success.

A ditch at least four feet deep is cut so as completely to intersect the whole line of these oozing springs, to the depth of about three feet, and it is continued to the open drain into which it must discharge its water, by the route affording the most convenient fall for that purpose. The ditch is cut gradually narrower from the top to the bottom, where it is not above eight inches wide. A row of poles, of such a size as nearly, but not entirely to touch, is laid on each side of the ditch at bottom. Green or seasoned brush, without leaves, trimmed to lie close, is then packed into the ditch, with the small ends downwards, and touching the poles, beginning at the upper end of the ditch. The inclination of the brush must be up stream, at an angle of about forty-five degrees with the bottom of the ditch; it must be packed as close with the hand as possible, and cut into lengths proper for the end of filling the ditch within ten inches of the top. The brush is then to be covered with four inches of dry sound leaves of any kind, and the whole of the earth to be returned upon the ditch and well rammed. It will press down the brush and leaves low enough to admit of any species of culture without disturbing them. The oozing water will be received by the former, and must trickle through the apertures caused by having its small ends at bottom, and by the poles, down to the open drain, and the soured ground will lose every boggy appearance.

This mode of draining seems in description to be more troublesome, than I have found it to be in practice. Unless its duration could be ascertained, we cannot certainly pronounce as to its cheapness. The oldest I have had an opportunity of attending to, was constructed about ten years past. Its objects were to render a road dry, and about two acres of soured barren land better, by sinking a line of oozing springs lying collaterally with the road, which made it a quagmire in wet weather, and rendered the two acres barren.—The road has been ever since dry and firm, and the land, of the best in the field. I cannot help thinking that a well constructed drain of this kind, will last a century. Where stones can be had, they may be made to last for ever, but I doubt whether brick work would be equal to the brush.

But this is like shooting speculation a century beyond hope. It is superfluous to invent modes of preserving spots, whilst we are destroying districts. I will therefore return to the subject, as it relates to draining the vast body of land lying on creeks and small rivers. There is no species of draining so cheap or beneficial, as where there is water sufficient to perform a chief part of the work. Most streams can perform some of it. In either case, the removal of obstructions of wood or loose stone, requires infinitely less labor, than to dig an equivalent canal; and the water thus aided, will continue to deepen its channel, until its efforts are controlled by withholding the assistance. The earth it scoops out of the channel, becomes an alluvion for curing an abundance of chasms and inequalities, the fruit of torrents and obstructions. And by correcting some angles, and deepening the channels of the creeks, and small rivers, a very

large quantity of the best land now yielding foul air, may be brought at a trifling expense to yield fine crops.

For the introduction of this mode of draining, the cheapest, the most practicable, and the most profitable, a law is necessary. I do not know that Coke's Summa Ratio provides for the case, and the absurdities to be found in the code, upon which this exalted encomium is pronounced, are records of human folly sufficient to shake a confidence in the good sense and justice of an entire nation, however plain the case may be. A proprietor below may perhaps be found, blind to the clear moral obligations which require him to remove the obstructions against the draining of a proprietor above; whilst one above may be so lynx-eyed, as to see injuries to himself from draining land below. And yet the prosperity and the health of the whole nation is at least as deeply affected by the object, as by the establishment of roads; nor would a lower country which should stop all the roads leading from above, act as unjustly or absurdly as those who stop the drains from above. It would not injure the climate, and by arresting commodities, it would establish some monopoly beneficial to itself; but the obstructor of draining gains no exclusive advantage, and shares in the general calamity of a bad climate.

Such laws are not novel. Pennsylvania is indebted to them for some of her finest farms. I much question whether the state legislatures have a power to pass any laws equally beneficial. They might try the experiment, short of that requiring social embankments, by only imposing the simple and easy obligation of keeping up a social current, sufficient to drain all lands above, in every stream lying above tide water. Such laws might at first be limited to the removal of obstructions of wood or earth, until experience should decide, whether they might not be beneficially extended even to obstructions of stone.

The residue of this subject contains in every view its most important division, and unfortunately meets with less capacity to do it justice. The benefits arising from draining the kind of ground we have passed over, though great in themselves, are inconsiderable, compared with those which would result from draining the marshes and sunken grounds upon tide water. A new country and climate would be gained by it. We know that the Dutch, in both hemispheres, have reclaimed rich countries from the ocean, whilst we abandon them to the rivers; but I do not recollect to have heard of a book upon draining and banking. My whole experience is confined to a single experiment, yet unfinished, the occurrences of which I shall relate, so far as they may be useful. It is made on ground similar to the body of marsh and wet land, abounding on the tide rivers and creeks of the eastern states, to an extent sufficient, if reclaimed, to dispense wealth and comfort, and unreclaimed, unwholesomeness and death.

About two hundred acres of such land, three fourths of which were subject to the tides, which fluctuate to the extent of about three feet, and within half a mile of a large river, is the subject of the experiment. The remaining fourth, though a few inches above tide water, was sunken land, covered with the usual growth of such ground. A large portion was soft marsh, subject to common tides, and nearly as much a sheet of water, shall-

low at low tides. On one side of this area, has been constructed a canal about eighteen feet wide, to conduct a creek sufficiently large for two mills above; and on the other, one half as wide, to receive and convey several small streams, and a great number of springs. At the termination of the work, these canals are connected by a dam nearly two hundred yards long, one half crossing the soft marsh, and the other the space constituting the former bed of the creek. These canals are between four and five miles long, and have been constructed cautiously and leisurely, to diminish the loss of the adventure, should it prove unsuccessful.

The experiment was commenced by cutting a ditch on the left side for the small canal, about four feet wide, and two deep, near the dry land, but wholly in the soil of the wet.—It was found to yield too little earth to make a bank high and strong enough to resist either inundations or high tides; that the earth became so porous, on drying, as to produce leaks and breaches; and that it was yet so adhesive as to admit of the burrowing of muskrats, with which the place abounded. Thus the first attempt failed, and a considerable ditch became wholly useless.

As this spongy and fibrous soil extended to the base of the hills on both sides, the next attempt was made by driving a double row of stakes and puncheons round and split, being six feet long, two feet into the wet ground, about eighteen from the dry, fitted together as close as possible, and covering them with the same kind of soil, dug out of the canal for conducting the creek, which afforded earth when cut about one foot deep, to cover the stakes. The result was, that the wooden wall under this spongy and fibrous earth, was no security against the muskrats, and that the bank was pierced by them at pleasure. The labor in wood was therefore lost, but not the insufficient channel, nor the bank.

The channel being about twelve inches deeper than the adjacent sunken ground, would contain and conduct the creek except in inundations, and as the bank hitherto described was in every view insufficient, chasms of fifteen or twenty feet wide were made in it at about three hundred yards apart, to let the water pass out when high. The creek was turned into this canal, with a view of floating the sand from above, and depositing it along the bottom, conveniently for removal to the bank in order to oppose its friable nature to the architectural skill of the muskrats.

At some convenient season once a year (for the experiment proceeded for years) the water of the creek being turned successively through these chasms above, left its bottom below of firm sand, which was very easily raised upon the bank. By the pressure of this annual alluvion of sand, upon the spongy soil, the channel of the creek became deeper, and the alluvion was increased, so that finally the first embankment, being greatly raised and completely covered with the sand filtered by the water into a state for the object, became a fortification proof against the skill of these troublesome animals.

The chasms left for inundations being of the kind of soil described, were not liable to be cut by the water into new channels, and their edges or banks, being higher than the bottom of the creek, very little sand could escape through them.

As the body of water on the left side, was too inconsiderable for the alluvion process, it became necessary to abandon the old ditch, and to commence a new one, so far touching upon the base of the rising dry land, as to secure a sufficiency of sand for the bank, and yet to be able to penetrate to the springs, which created a perpetual pond and bog in a portion of the area to be drained. It is now cut throughout its whole course of about three miles, so deep as to have reached many of the springs, with a bank able to command inundations, and tides. The bank was composed of sand only, (the wooden staccade having turned out to be useless) and being of considerable size, proved a complete barrier against the muskrats, in the following cases excepted: In three several places the bog or marsh, protruded into the dry land at right angles with the course of the ditch, in narrow necks not worth the expense of including. Two of these were about thirty yards wide, and the third near ten. All were crossed, and to save the trouble of getting sand for the bank, a more careful trial was made of the staccade and spongy soil. They proved in all three places insufficient to confine the water, or resist the muskrats. A sandy soil lay on both sides of these guts, but still it would be considerable labor to remove a quantity of it sufficient for the whole bank; to save this labor, a ditch was cut on the inner or lower side of the bank close to its base, three feet wide, and as many deep, quite across the mouths of the two largest guts, and filled with the adjacent sandy soil; and this thread of sand was continued on the back of the spongy part of the bank above high water mark in the canal. At the narrow gut the bank was well coated above ground with sand. At all three, success was complete.

Before the inefficacy of the staccade was discovered, it was resorted to in making the dam across the creek and marsh. Stakes and puncheons of about nine feet long were driven about three into the earth across both, in the centre of the intended dam, and in a triple row. Nine feet from this staccade on each side, a close and strong wattled fence of green cedar was made, for the purpose of holding the moist soil of the marsh, so far as the dam was to be compounded of it, and of arresting the sand, where it was to be made by an alluvion. By laying plank for the laborers on each side, at fifteen feet distance from these wattlings, and working backwards toward them, cutting out the earth as deeply as the laborers could reach, marsh earth was easily obtained at low tides to raise the dam to a sufficient height, so far as the marsh extended; but though it was eighteen feet wide, it proved unable to resist either the water or the muskrats. It therefore became necessary to cut a ditch along the whole length of this moiety of the dam, binding on the centre or staccade, four feet wide, and two feet deeper than the summit of the marsh, and to fill it with a thread of well filtered alluvion sand. This remedy has hitherto been sufficient, but nine months only having elapsed, since it was tried, it is not entirely confided in.

The remaining moiety of the dam was entirely composed of alluvion sand. For this object, the canal for the creek was made to terminate at a steep sandy hill, being cut close to its base. Care was taken to keep the bottom of the creek two feet above low water mark, for the sake of a cur-

rent, which being directed into two nine feet lanes, made by the staccade and the wattlings, gradually conveyed the sand into them, and forced the creek to retire into a narrow channel. To accelerate the operation, the sand of the hill was occasionally thrown into the creek, and to lessen the labor of doing it, the channel, as the canal widened by drafts of sand from the hill, was kept near its base. This was done by occasionally removing the stones and pebbles, generally found in sandy soils, and left behind by the filtration, to the base of the bank, where they produced the indispensable end of preventing the attrition of the current.

As much sand being thus conveyed and deposited as the descent would allow, two close parallel green cedar wattlings were made eighteen feet below the lowest hitherto mentioned, from the highland to the marsh; the cut through the marsh on the lower side, made in raising that part of the dam, was converted into a channel for the creek to the opposite high-land and a short canal was cut through a neck of marsh, to conduct it from thence to tide water below. And thenceforth the sand was deposited by the current along the whole extent of the dam, from whence it was occasionally with great ease removed upon it, by taking off the creek in low tides and dry seasons, in which there is no difficulty.

In carrying the staccade across the creek, great care was taken to make its top one foot higher than the highest tides, and on covering it with the sand, the aperture left for the tides was closed. The dam was however twice broken by high tides, before it was conjectured that the sand by its weight had compressed the porous marsh soil of which the bottom of the creek was composed, and lowered the whole staccade with it. Upon a strict attention to this idea, however, it was concluded, that such a compressure, in proportion to weight and compressibility took place throughout the dam and banks; and that though it required occasional additions to both, to preserve their level at least two feet above the highest tides and inundations, its effect of obstructing the percolation of the surrounding water into the space to be drained, admitted by the nature of the soil to a great extent, was a full retribution for the labor thus expended.

The dam and banks being closed quite around, to get rid of the internal water, constituted the remaining difficulty. It was necessary to construct a gate to discharge it at low tides. A tide gate in the centre of the dam was unsuccessfully tried. And finally a trunk made of two inch oak plank, sixteen feet long, with a cavity three feet wide and one deep, answered the end much better than any other experiment. The water on the inside passes along the dam, parallel to the water on the out, in the channel cut for raising the dam across the marsh, to the small canal near the junction of its bank with the dam. At this spot the foundation is an unctuous fillers' earth. The place being made by bay-dams, was dug out to the precise level of low water, and the trunk accurately laid down upon it. Plank one foot wide was sunk quite around it edgewise, so as to lap two inches on the bottom of the trunk, and the whole was covered with earth, and well rammed to within two feet of the ends, so as to discharge the water into the small canal. At each aperture of the trunk is a door made of a single plank, fitted to the outside, having four folds of coarse woollen

cloth, dipped in hot tar, nailed on so as to fit the mouths of the box, fixed by strong hinges made for the purpose, and latched under water by the help of a long handle attached to the latch. The defect hitherto discovered is, that the trunk is not long enough by about six feet.

This species of trunk was first tried to save the water of a small branch for grinding gypsum, in a simple tub mill, built for that purpose. Only one door, and no latch was necessary. The pressure of the water in the pond was such, that when high, a strong chain attached well to the door, worked with a small lever, was necessary to open it. A hole of two inches diameter, kept closed with a large peg, to be pulled out by a pole fastened to it, was resorted to for diminishing the resistance of the water, and caused the door to open more easily. And the end of saving the water was very well effected.

It was discovered that the interval water to be voided by the trunk was vastly increased by springs passing under the canals, for which there was no remedy but to deepen them. This remedy was applied to the small one with such effect, that its continuance, until the bottom in its whole course shall be brought to a level with the water at low tide, is confidently considered as a certain cure for the evil. The number and size of the springs discovered were beyond expectation, and the interception of the residue is considered as certain. The large canal could not be deepened hitherto, because it has not quite finished the work of alluvion. But there will be no difficulty in cutting off the springs beneath it, by a narrow ditch in the centre. For when this work is done, the obstructions to prevent the creek from deepening itself will be removed, and that operation will both lessen the work of penetrating to the springs, and also bestow upon the bank a more perfect degree of strength.

The efforts used to prevent the abrasion of the water in acute angles, eddies or strong currents, consisted of single or double wattles of green cedar, in proper declivities to resist water, and to retain earth; and of throwing all stones and gravel washed from the base of the hills cut by the canal, to the base of the bank. The bank also, generally, had covered itself before its apertures, for allowing a passage to inundations, were closed, with a strong tegument of shrubs, weeds or grass; and these several remedies against the attrition of the current have hitherto been effectual. A portion of the land heretofore flooded by common tides, is quite dry, and will be this year cultivated.

After widening the dam by alluvion, to about thirty feet, the creek will no longer be kept parallel with it, but will be sent straight on from the right bank. And the bank is destined to the use of apple trees.

The sandy soil approximating upon most or all of the marshes and sunken grounds of the eastern states, seems to be the providential provision of the means for reclaiming them; and the multitude of currents passing through this soil, are like vehicles for conveying these means to the necessary positions. They are vehicles which disregard distance, travel constantly and never decay. They will calk the most porous soil, overwhelm the strongest vermin, and follow the slightest direction. Their efforts may be aided by the plough, by removing obstructions, and by tumbling into them

sandy declivities with little labor, near to which they should be guided for that purpose.

TOBACCO.

The extent of country yet devoted to the cultivation of this plant, entitles it to a place in an agricultural ephemeris, the object of which is, to kill bad habits, and to be killed itself by a complete system. The preservableness of tobacco, endows it with the rare capacity of waiting for a market, and constituted a recommendation which induced me to cultivate it attentively during two years.—Both crops succeeded beyond the medium calculation, and the experiments still exhibited results conclusively proving the propriety of its abandonment. These results were all with ease reduced to figures. It was easy to fix the value of labor bestowed on an acre of tobacco, and on its crop after severance; and on an acre of corn or wheat, with the preparation of its crop also for market. It was as easy to ascertain the produce of equal soils, and prices were settled by sales. Such estimates demonstrated the loss of growing tobacco, merely on the score of annual profit, without taking into the account, the formidable obstacle it constitutes to the improvement of land.

This objection is not founded upon the erroneous opinion, that it is peculiarly an impoverisher. On the contrary, my impression was, that it was less so, than any other crop I knew of, except cotton and the sweet potato. But upon its enormous consumption of labor, and its diminutive returns of manure. It would startle even an old planter, to see an exact account of the labor devoured by an acre of tobacco, and the preparation of the crop for market. Even supposing that crop to amount to the extraordinary quantity of one thousand pounds, he would find it seldom, if ever, producing a profit upon a fair calculation. He would be astonished to discover how often he had passed over the land, and the tobacco, through his hands, in fallowing, hilling, cutting off hills, planting, replantings, toppings, suckerings, weedings, cuttings, picking up, removing out of the ground by hand, hanging, striking, stripping, stemming, and prizing, and that the same labor, devoted to almost any other employment, would have produced a better return by ordinary success, than tobacco does by the extravagant crop I have supposed.

Though its profit is small or nothing, its quality of starving every thing, exceeds that of every other crop. It starves the earth by producing but little litter, and it starves its cultivators, by producing nothing to eat. Whatever plenty or splendor it may bestow on its owner, the soil it feeds on must necessarily become cadaverous, and its cultivators equalid. Nor can it possibly diffuse over the face of the earth, or the faces of its inhabitants, the exuberance which flows from fertilization, nor the happiness which flows from plenty.

A substitute is the object of inquiry, after we are convinced of the detrimental nature of any crop. When flour sells for as much as tobacco, by the pound, wheat would be a complete one, at any distance from water carriage; but as that is seldom the case, others must be sought after.

The extent and population of the country,

within reach of navigable water, opens to the tobacco districts a wide market, for the disposal of many better substitutions. Horses, mules, beef and pork, would more than suffice to replace all the advantages lost by relinquishing the culture of tobacco; and materials for manufacturing, with manufacturing itself, would amply provide for any possible deficiency. The market for live stock and meat, is so great and valuable in the bread stuff districts of the eastern waters, as to attract supplies from quarters far beyond the narrow tobacco belt, with which they are immediately surrounded; and if it is a question in the best cultivated countries, whether grazing and breeding live stock, even upon the margin of navigation, is not the most profitable agricultural employment, every doubt vanishes in comparing it with the culture of tobacco, in situations where the capacity of walking to market will create a considerable item of that comparison.

The system of agriculture, for a bread stuff farm, according to the experience I have had, requires live stock sufficient to consume and reduce to manure every species of provender and litter; in effecting which, a sufficiency of meat may be provided for the laborers, either without expense, or even producing a profit. But if I am right in concluding that the live stock of such a farm ought to stop at that point, whenever its situation renders the expense of transporting its grain to market trivial, it follows, that a vast market would remain for the meat and live stock of the tobacco district, consisting of towns, artizans, all who live by professions and the interest of money; and of the bread stuff farmers themselves, as to horses and mules, the breeding of which is excluded by this system, and as to pork also, wherever a better mode of raising it than the present shall not be adopted.

Having had no experience of a farm devoted to raising live stock, my observations are conjectural. It seems to me that manuring might be carried much farther, where the whole produce was consumed on the land, than when a part of it was exported; that the product might be therefore more rapidly increased, and the space cultivated, diminished; and that the herbaceous and succulent crops would so far banish the use of those more exhausting, as greatly to accelerate the improvement of the exhausted tobacco district, and to insure an immediate or very near return of profit, exclusively of a return of comfort, far exceeding that to which it has been accustomed.

THE ECONOMY OF AGRICULTURE.

There is no subject less understood, nor more generally mistaken than this; nor any more essential to the prosperity of agriculture. Sufficient to afford matter for an entire treatise, it cannot be embraced by a short chapter. But a short chapter may put minds upon the track, able to unfold its involutions with every branch of agriculture, and more specially to disclose its value.

Diminutions of comforts, necessities and expense, are too often mistaken for the means of producing the ends they obstruct; and the rapacity which starves, frequently receives the just retribution of a disappointment, begotten by a vicious

mode of avoiding it. From the master down to the meanest utensil, the best capacity for fulfilling the contemplated ends, is invariably the best economy; and the same reasoning which demonstrates the bad economy of a shattered loom, will demonstrate the bad economy of a shattered constitution, or an imperfect state of body. The cottagers who inflict upon themselves and their families the discomforts of cold houses, bad bedding and insufficient clothing, to acquire wealth, destroy the vigor both of the mind and body, necessary for obtaining the contemplated end, at which of course, they can never arrive. The farmer who starves his slaves is a still greater sufferer. He loses the profits produced by health, strength and alacrity; and suffers the losses caused by disease, short life, weakness and dejection. A portion, or the whole of the profit arising from their increase is also lost. Moreover, he is exposed to various injuries from the vices inspired by severe privations, and rejects the best sponsor for his happiness, as well as prosperity, by banishing the solace of labor. In like manner, the more perfect, the more profitable are working animals and implements, and every saving by which the capacity of either to fulfil their destiny in the best manner is diminished, terminates with certainty in some portion of loss, and not unfrequently in extravagant waste. Even the object of manuring is vastly affected by the plight of those animals by which it is aided.

A pinching miserly system of agriculture, may indeed keep a farmer out of a prison, but it will never lodge him in a palace. Great profit depends on great improvements of the soil, and great improvements can never be made by penurious efforts. The discrimination between useful and productive, and useless and barren expenses, contains the agricultural secret for acquiring happiness and wealth. A good farmer will sow the first with an open hand, and eradicate every seed of the other.

Liberality constitutes the economy of agriculture, and perhaps it is the solitary human occupation, to which the adage, "the more we give, the more we shall receive," can be justly applied. Liberality to the earth in manuring and culture is the fountain of its bounty to us. Liberality to slaves and working animals is the fountain of their profit. Liberality to domestic brutes is the fountain of manure. By raising in proper modes a sufficiency of meat for our laborers, we bestow a strength upon their bodies, and a fertility upon the ground, either of which will recompense us for the expense of the meat, and the other will be a profit. The good work of a strong team, causes a profit beyond the bad work of a weak one, after deducting the additional expense of feeding it; and it saves moreover half the labor of a driver, sunk in following a bad one. Liberality in warm houses produces health, strength and comfort; preserves the lives of a multitude of domestic animals; causes all animals to thrive on less food; and secures from damage all kinds of crops. And liberality in the utensils of husbandry, saves labor to a vast extent, by providing the proper tools for doing the work both well and expeditiously.

Foresight is another item in the economy of agriculture. It consists in preparing work for all weather, and doing all work in proper weather, and at proper times. The climate of the United

States makes the first easy, and the second less difficult than in most countries. Ruinous violations of this important rule are yet frequent from temper and impatience. Nothing is more common than a persistence in ploughing, making hay, cutting wheat, and other works, when a small delay might have escaped a great loss; and the labor employed to destroy, would have been employed to save. Crops of all kinds are often planted or sown at improper periods or unseasonably, in relation to the state of the weather, to their detriment or destruction, from the want of an arrangement of the work on a farm, calculated for doing every species of it precisely at the periods, and in the seasons, most likely to enhance its profit.

A third item in the economy of agriculture is not to kill time by doing the same thing twice over. However laboriously at work, we are doing nothing during one of the operations, and frequently worse than nothing, on account of the double detriment of tools, teams and clothing. The losses to farmers occasioned by this error, are prodigious under every defective system of agriculture, and under ours are enormously enhanced by the habit of sharing in the crop with an annual overseer. Shifts and contrivances innumerable are resorted to, for saving present time, by bad and perishable work, at an enormous loss of future time, until at length the several fragments of time thus destroyed, visibly appear spread over a farm, in the form of ruined houses, fences, orchards and soil; demonstrating that every advantage of such shifts is the parent of many disadvantages, and that a habit of finishing every species of work in the best mode, is the best economy.

The high importance of this article of agricultural economy demands an illustration. Let us suppose that dead wood fencing will consume ten per centum of a farmer's time, which supposition devotes about thirty-six days in the year to that object. It would cost him five whole years in fifty. If his farm afforded stone, and his force could in one whole year make his enclosures of that lasting material, he would save four whole years by this more perfect operation; exclusive of the benefits gained by a longer life, or transmitted to his posterity. If his farm did not furnish stone, as live fences can be made with infinitely less labor than stone, his saving of time would be greater by raising them, but the donation to posterity less from their more perishable nature. It seems to me that the time necessary to rear and repair live fences, is less than one tenth of that consumed by those of dead wood. By doing this article of work in a mode thus surpassing the present miserable fencing shifts in use, our farmers would gain the enormous profit of four years and an half in fifty, and an entire country, that of nine years in each hundred. Time constitutes profit or loss in agriculture, and many other employments. Such an enormous loss is itself sufficient to bankrupt the soil of a fine country. Transformed into an equivalent gain, the difference of eighteen per centum to the same country might retrieve it. The case simply consists of the difference between paying and receiving enormous usury, for the sake of growing rich.

I have selected a few items merely to attract the reader's attention to the economy of agriculture, that his own sagacity may pursue the subject be-

yond the limits assigned to these essays. It is one highly necessary to all practical men, and worthy of the minute consideration of the most profound mind; nor do I know one exhibiting to experience and talents a stronger invitation to make themselves useful.

THE PLEASURES OF AGRICULTURE

In free countries are more, and in enslaved fewer, than the pleasures of most other employments. The reason of it is, that agriculture both from its nature, and also as being generally the employment of a great portion of a nation, cannot be united with power, considered as an exclusive interest. It must of course be enslaved, wherever despotism exists, and its masters will enjoy more pleasures in that case, than it can ever reach. On the contrary, where power is not an exclusive, but a general interest, agriculture can employ its own energies for the attainment of its own happiness.

Under a free government it has before it the inexhaustible sources of human pleasure, of fitting ideas to substances, and substances to ideas; and of a constant rotation of hope and fruition.

The novelty, frequency and exactness of accommodations between our ideas and operations, constitute the most exquisite source of mental pleasure. Agriculture feeds it with endless supplies in the natures of soils, plants, climates, manures, instruments of culture and domestic animals. Their combinations are inexhaustible, the novelty of results is endless, discrimination and adaptation are never idle, and an unsatiated interest receives gratifications in quick succession.

Benevolence is so closely associated with this interest, that its exertion in numberless instances, is necessary to foster it. Liberality in supplying its laborers with the comforts of life is the best sponsor for the prosperity of agriculture, and the practice of almost every moral virtue is amply remunerated in this world, whilst it is also the best surety for attaining the blessings of the next. Poetry, in allowing more virtue to agriculture, than to any other profession, has abandoned her privilege of fiction, and yielded to the natural moral effect of the absence of temptation. The same fact is commemorated by religion, upon an occasion the most solemn, within the scope of the human imagination. At the awful day of judgment, the discrimination of the good from the wicked, is not made by the criterion of sects or of dogmas, but by one which constitutes the daily employment and the great end of agriculture. The Judge upon this occasion has by anticipation pronounced, that to feed the hungry, clothe the naked, and give drink to the thirsty, are the passports to future happiness; and the divine intelligence which selected an agricultural state as a paradise for its first favorites, has here again prescribed the agricultural virtues as the means for the admission of their posterity into heaven.

With the pleasures of religion, agriculture unites those of patriotism, and among the worthy competitors for pre-eminence in the practice of this cardinal virtue, a profound author assigns a high station to him who has made two blades of grass grow instead of one; an idea capable of a signal amplification, by a comparison between

a system of agriculture which doubles the fertility of a country, and a successful war which doubles its territory. By the first the territory itself is also substantially doubled, without wasting the lives, the wealth, or the liberty of the nation which has thus subdued sterility, and drawn prosperity from a willing source. By the second, the blood pretended to be enriched, is spilt; the wealth pretended to be increased, is wasted; the liberty said to be secured, is immolated to the patriotism of a victorious army; and desolation in every form is made to stalk in the glittering garb of false glory, throughout some neighboring country. Moral law decides the preference with undeviating consistency, in assigning to the nation, which elects true patriotism, the recompense of truth, and to the electors of the false, the expiation of error. To the respective agents, the same law assigns the remorse of a conqueror, and the quiet conscience of the agriculturist.

The capacity of agriculture for affording luxuries to the body, is not less conspicuous than its capacity for affording luxuries to the mind; it being a science singularly possessing the double qualities of feeding with unbounded liberality, both the moral appetites of the one, and the physical wants of the other. It can even feed a morbid love of money, whilst it is habituating us to the practice of virtue; and whilst it provides for the wants of the philosopher, it affords him ample room for the most curious and yet useful researches. In short, by the exercise it gives both to the body and to the mind, it secures health and vigor to both; and by combining a thorough knowledge of the real affairs of life, with a necessity for investigating the arcana of nature, and the strongest invitations to the practice of morality, it becomes the best architect of a complete man.

If this eulogy should succeed in awakening the attention of men of science to a skilful practice of agriculture, they will become models for individuals, and guardians for national happiness. The discoveries of the learned will be practised by the ignorant; and a system which sheds happiness, plenty and virtue all around, will be gradually substituted for one which fosters vice, breeds want, and begets misery.

Politicians (who ought to know the most, and generally know the least, of a science in which the United States are more deeply interested than in any other) will appear, of more practical knowledge, or at least of better theoretical instruction; and the hopeless habit of confiding our greatest interest to people most ignorant of it, will be abandoned.

The errors of politicians ignorant of agriculture, or their projects designed to oppress it, can only rob it of its pleasures, and consign it to contempt and misery. This revolution of its natural state, is invariably affected by war, armies, heavy taxes, or exclusive privileges. In two cases alone, have nations ever gained any thing by war. Those of repelling invasion and emigrating into a more fruitful territory. In every other case, the industrious of all professions suffer by war, the effects of which, in its modern form, are precisely the same to the victorious and the vanquished nation. The least evil to be apprehended from victorious armies, is a permanent system of heavy taxation, than which, nothing can more vitally wound or kill the pleasures of agriculture. Of the same

stamp, are exclusive privileges in every form; and to pillage or steal under the sanction of the statute books, is no less fatal to the happiness of agriculture, than the hierarchical tyranny over the soul, under the pretended sanction of God, or the feudal tyranny over the body, under the equally fraudulent pretence of defending the nation. In a climate and soil, where good culture never fails to beget plenty, where bad cannot produce famine, begirt by nature against the risk of invasion, and favored by the accident with the power of self-government, agriculture can only lose its happiness by the folly or fraud of statesmen, or by its own ignorance.

THE RIGHTS OF AGRICULTURE.

It is lamentable to confess, that this, to be a true, must be almost a negative number. This most useful and virtuous interest enjoys no rights, except in the United States; and there it enjoys no exclusive rights, whilst the few in which it shares are daily contracted by the various arts of ambition and avarice. Every where else, agriculture is a slave; here she is only a dupe. Abroad she is condemned by avowed force to feed voluptuousness, avarice and ambition; here, she is deluded by flattery and craft, during fits of joy or of fury, to squander her property, to mortgage her laborers, and to shackle her freedom. Abroad, she suffers contempt, and is sensible of her degradation; here, she is a blind Quixote, mounted on a wooden horse, and persuaded by the acclamations of her foes, that she is soaring to the stars, whilst she is ready to tumble into the dust.

Privileges are rearing by laws all around at her expense, and whilst she is taught to believe that they will only take from her a few inconsiderable slips, they will at length draw a spacious circumvallation, within which will gradually grow up a power, beyond her control. Tricks, as well as inventions, are daily fortified with legal bulwarks, called charters, to transfer her wealth, and to secure frauds against her efforts. Capital in every form, save that of agriculture, is fed by taxes and by bounties, which she must pay; whilst not a single bounty is paid to her by capital in any form; and instead of being favored with some prizes in the lottery of society, she pays most, and is rewarded herself by the blanks of underwriting the projects of statesmen, and bearing the burthens of government.

The use of society is to secure the fruits of his own industry and talents to each associator. Its abuse consists in artifice or force, for transferring those fruits from some partners to others. Of this abuse, that interest covering the majority of partners is the victim. And the difficulty of discriminating laws, transferring such fruits for the benefit of society, from those having in view the gratification of avarice and ambition, produces a sympathy and combination between these distinct kinds of law. As the members of the government, and members of legal frauds, both extract power and income from the majority, they are apt to coalesce; and each party to favor the designs of its ally, in their operations upon the common enemy. Hence governments love to create exclusive rights, and exclusive rights cling to governments. The liga-

ment of parent and child, binds them together, and the power creating these abuses, must make them props for its support, or instruments for its subversion. Its election between these alternatives is certain, and society is thus unavoidably thrown into two divisions. One containing all those who pay, and the other those who receive contributions, required either for public use, or to foster private avarice or ambition. Good government is graduated by this latter kind of contribution thus unfortunately allied to the former. The highest amount constitutes the worst, and the lowest, the best possible species of government. But as both are drawn from the majority of every society, whenever the agricultural interest covers that majority, this interest is the victim of the coalition; and as it almost universally does cover this majority, the agricultural interest is almost universally its slaves.

The consequences to agriculture will be demonstrated by converting this coalition between government and its creatures, or of all who receive tools given by law, into a political pope, and placing in his mouth an address to agriculture, in a parody of Ernulphus' form of excommunication:

"May you be taxed in your lands, your slaves, your houses, your carriages, your horses, your clothing, your liquors, your coffee, your tea, and your salt. May you be taxed by banks, by protecting duties, by embargoes, and by charters of a thousand different forms. May the exemption of your exports from taxation be removed, and may you then be taxed through your wheat, your corn, your tobacco, your cotton, your rice, your indigo, your sugar, your hemp, your live stock, your beef, your pork, your tar, pitch and turpentine, your onions, your cheese, and your potatoes. May you be taxed for the support of government, or to enrich exclusive or chartered interests, through every article you import, and through every article you export, by duties called protecting, but intended to take away your constitutional protection against taxation for the benefit of capitalists. May you be taxed through every article produced by your labor or necessary to your subsistence, comfort and pleasure, by excises. And whilst every species of your products, and of your consumptions are thus taxed, may your capital, being visible, be moreover taxed in various modes. May all these taxes, whether plain or intricate, (after deducting the small sum necessary to produce the genuine end of society,) be employed in enriching capitalists, and buying soldiers, placemen and contractors to make you submissive to usurpations, and as quiet under your burthens, as a martyr tied to the stake, under the flames. After you have been taxed as far as you can pay, may you by the bounty of God Almighty be moreover mortgaged up to your value or credit, for the benefit of the said coalition of capitalists. And finally, may none of this good and useful coalition, to whom is given the wealth of this world, as the kingdom of heaven is to the pope and his clergy, be taxed in their stock or principal held under any law or charter whatsoever; nor in their capital employed in any manufacture or speculation, nor in any profit drawn from such principal stock or capital; nor through any of their sinecures, salaries, contracts or incomes; but on the contrary, may such stock, principal, capital, profits, salaries, contracts, and sine-

cures, be constantly fostered by bounties in various injurious forms, to be paid by you, you damned, dirty, working, productive bitch, agriculture." Throughout the world, agriculture, like one of Ernulphus' contrite excommunicants, responds, amen, to this pious invocation.

Throughout the world, agriculture has enjoyed, and in England continues to enjoy, one of the rights in which she has a share in the United States; that of a voice in elections. And throughout the world, this right has been unable to shield her against an anathema, which prescribes for her as perfect a hell, as the formula of Ernulphus prescribes for his heretic. Let the agricultural interest of the United States pause here, and look around. Is a blind confidence in a right so universally ineffectual, a sufficient safeguard for its freedom and happiness? To me it seems that an interest can never be long free, which blindly confides in a coalition, whose object it is to draw from that interest power and wealth. That the major interest must be as cunning, as wise and as watchful, as the minor, or that the minor interest will enslave it. And that agriculture must as attentively keep her eyes upon the coalition, to avoid its operations upon her, as the coalition does upon agriculture, for the purpose of transferring to its members portions of her power and wealth whenever she slumbers.

Hence have arisen the political suggestions to be found in these essays. I cannot discern much good in an improvement of agriculture, to get luxury, voluptuousness and tyranny for a few, and wretchedness for a multitude. The best cultivated country in the world abounds most in paupers and thieves. Agriculture must be a politician to avoid this fate; and those who ridicule her pretensions to knowledge in this science, intend by persuading her to repose in a blind confidence, built upon the frail right of election, to expose her to it. How can she even judiciously elect, if she cannot or will not judge of public measures, by the light of her own interest?

The moral consequence of this supineness or ignorance is, that social happiness gradually becomes the dependant of a minority, and of course it is provided for by continually subtracting from the happiness of a majority. The visible immorality of this demonstrates the virtue, as well as wisdom of suggestions designed to obstruct it.

The remaining right in which agriculture participates, in common with all other interests, having any thing to export, is bestowed by the constitutional prohibition of duties upon exports. This right originated in state jealousies, and not from a disposition to favor agriculture, but yet it is her best security, for the preservation of that portion of our government, which will longest be sensible of her elective influence; and its relinquishment will be the most fatal wound which can be inflicted on her. The coalition I have described will try every art in her most unguarded moments, to snatch it from her, and it will be the last relinquishment it will need. To determine whether her elective influence can bear further wounds, let agriculture resurvey the legislation of our whole term of independence, and compare the catalogues she may select, of laws for creating or fostering privileges and exclusive interest, with those for fostering herself; and let this comparison form the criterion for ascertaining her legislative

influence. Thus only can she judiciously increase this influence, if it has settled too low, or diminish it, if it has raised too high. There is no fair mode of judging, except by these legislative acts. To infer that the agricultural interest influences legislatures, because it chiefly elects them, would be like inferring, that the French nation influences the tribunate, because they wholly elect it. Let agriculture therefore hold fast the solitary security she enjoys in common with her industrious associates, against the ambition of usurpers, and the avarice of capitalists, nor be deluded into the absurd notion, that it is wise to relinquish the only peculium of industry, for the sake of some temporary operation upon foreign nations, inevitably resulting upon herself in the form of retaliation, whilst the protection of exports against taxation will be gone for ever.

AGRICULTURE AND THE MILITIA,—

The rocks of our salvation, as they are called by legislatures, presidents, governors, and toast-makers, throughout the United States; and hard rocks indeed they need be, to withstand the saws, wedges, and chisels, made by law, to cut, split and chip them to pieces. It is probable that more talents were wasted upon the bank of the United States, at each of its epochs, than have been expended for the improvements of these national fortresses, for securing wealth and independence, since the revolution. Edifice, after edifice, has been raised upon their ruins; but the new structures resemble the venerable fabrics from whence they are torn, as the modern huts raised of its ruins resemble the ancient city of Palmyra.

A pernicious little army, (pernicious as constituting a reason for neglecting the militia,) a species of marine preparation, whose most striking features are decay, imbecility and expense; and an awful unconstitutional precedent, for resorting to a volunteer militia, officered by the president instead of the states, have dismantled one fortress, and all the arts to enrich capital and speculation legerdemain, by paper, at the expense of property and industry, as practised in England, are playing upon the other.

When the future historian of our republic, shall search for acts of patriotism, and matter for biography, the contrast between the heroes who have created, and the politicians who have ruined a nation, will afford him ample room for exhausting the strongest phrases of eulogy and censure. The first was not effected by enfeebling the heart, nor will the second be avoided by impoverishing the soil and its cultivators; by beguiling the militia of its power and importance, with substitutions founded in the pretext of diminishing its duty, but preparing the means of usurpation for some ambitious president; and by taxing agriculture in various crafty modes, under pretence of enriching it, but in fact to enrich capitalists at its expense.

The patriots of the revolution have chiefly retired to the enjoyment of a treasure, deposited beyond the schemes of craft, leaving to their successors two specious fields as productive of glory, as the field of war was to them. Far from exhausting the resources for gaining the transport,

ing consciousness of having benefited our country, they left for these successors the creation of a proud militia and a fertile country, as equally meriting national admiration and gratitude, with the seats which secured our independence, and placed prosperity within our reach. But of what avail is it, that one set of patriots should have cut away the causes which enfeebled our militia, and impoverished our agriculture, if another does not enable us to reap from their valour the rewards which excited it? After wading through the calamities of war near to these rewards, to reject them, one by neglect, and the other by the preference of a harpy which always eats and never feeds, seems only consistent with the policy of the British parliament, which excited the resistance of the revolutionary heroes. Had they been told that they were fighting to destroy the militia, and to make agriculture food for charter and paper capital, they would have discerned no reason for making themselves food for powder.

It would be easy to show that agriculture never can experience fair treatment without a sound militia, but it is a subject too extensive and important to be considered in this light way, and therefore they are only exhibited in union, in the concluding essay, to remind the reader, that they are political twins, one of whom never lives long free, after the other dies.

Executive, legislative and festive encomiums of these twins, which ought to be called "Liberty and prosperity," though the unhappy delusions of fervor, produce the knavish effects of flattery: they prevent us from acquiring a militia and an agriculture, which deserve praise, (false praise always excludes real merit,) and keep us without laws for raising either to mediocrity, much less to perfection. I do not believe that these encomiums are generally the artifices of deliberate vice and secret purpose, to impose upon the enthusiastic and unwary, in pursuance of the precedents so often exhibited by rapacious priests clothed in the garb of sanctity; but yet rapacity may sometimes assume the language of patriotism, to keep the people blind to the dangers which threaten, and to the measures which can save them.

The good humor of the festive board will bear illustrations of these assertions, with less discomfort than cold design, or deluded negligence; and therefore, however inconsistent it may be with the gravity and importance of our subject, an aversion for giving pain to any one, induces me to supply it with the following toasts:

The militia—The rock of our liberty.

Unarmed, undisciplined, and without uniformity, substituted by an ineffectual navy, an ineffectual army, and paper volunteers, officered by the president.

Unpatronized even at the expense of a gun boat. Flattered and despised.

Taught self contempt, instead of a proud and erect spirit.—*Nine cheers.*

Agriculture—The fountain of our wealth.

A land killer.

A payer of bounties and receiver of none.

A beautifier of towns and a sacrificer of the country.

A cultivator for stock, without stock for cultivation.

Giving its money to those who will give it flattery. A weight in the legislative scales of the United States, as much heavier than a feather, as a feather is heavier than nothing.

Its labor steeped in an infusion of thievery, dissatisfaction, and sedition, by a mixture of bond and free negroes.

Producing 40,000,000 dollars annually for exportation, bearing most taxes for public benefit, and taxed in various modes for the private benefit of 300,000,000 dollars worth of capitalists who pay no taxes.

Out of a remnant of the 40,000,000 dollars exported, compelled by protecting duties to pay heavy bounties for the encouragement of manufactures already amounting to above 150,000,000 dollars annually.—*Nine cheers more.*

A few words, at parting, to the reader, will close these essays. If he is of the courteous nature which loves to give and to receive flattery, or if his interest tugs him violently against them, he may disbelieve the plainest truths they contain, or at least reject them as being told in too blunt a style. If he is ignorant of agriculture, or a devotee of a party or an idol, he will rather presume, that our agriculture is perfect and undefrauded, than take the trouble of enabling himself to judge, or silently swallow the grossest errors, than give up his superstition. These papers never contemplated the desperate hope of obtaining the attention of any one of these characters. Half the profit of agriculture must undoubtedly convince the several tribes of capitalists, that it flourishes exceedingly. The idolator will rather embrace the stake than truth, and the agriculturist, who prefers ignorance to knowledge, though these hasty essays constituted a complete system of husbandry, would be as little benefited by them, as a lawyer or a physician who practised by deputy, would be by the Reports of Coke, or the Dispensatory of Cullen. Yet to those who would think and inquire, opinions slowly and cautiously admitted, upon various views of national interest, without a motive likely to mislead or deceive, might afford suggestions capable of becoming subservient to better talents, awakened to the discussion of subjects so momentous to national happiness. To awaken such, was the summit of the author's design. [Note G.]

COTTON.

The cultivation of this crop, so important to the United States, was not overlooked, but omitted because it was probably better understood by others. But not having seen any thing published in relation to it, and having paid some attention to it for many years, it is not any longer neglected. The root of cotton sinks deep into the earth. Hence it requires deep culture. This is not as attainable by the hoe as by the plough. The best mode of effecting it which I have tried, is to lay off the ground in four feet ridges, raising those ridges as high as possible, and opening the middle furrows as deep as possible. This operation should take place in the fall or early in the winter, leaving the land in that state until it is time to plant the seed. Then these ridges should be reversed, making them very high upon the furrows. The ex-

posure of the furrows to the atmosphere through the winter, will render the earth more friable at their bottoms, and more pervious to the roots of the cotton. Its benefit will be more or less, as the soil may be light or stiff; but the fertilizing qualities of the atmosphere will make it of some value even to sandy soils. Further, the first deep ploughing in raising the ridges will bury whatever vegetable matter may lie on the surface, reduce it by the spring to some degree of putrescence and cause it to be converted into food for the cotton, through the summer. And the second will bury the seeds of grass or weeds so deep, that many of them will fail to vegetate, and thereby the labor of cultivation will be diminished, whilst the crop, being less infested with those rivals for subsistence, will be increased. As the cotton plant grows until frost, it is generally made more productive by early planting. The quickest mode of planting I have tried, is to open the tops of the ridges with a small trowel hoe plough, drawn by two horses, that one may walk in each furrow, and a straight line may be made to receive the seed. This plough has a mould board on each side, to raise and deposite on both sides of its furrow earth sufficient to cover the seed. A line is carried fastened to a shaft at each end, across the ridges, having marks of colored stuff at the distances designed for the plant. The planters follow the line, each taking one row, drop the seed at the marks, and cover it with the earth provided on each side by the plough, using the hand which deposite the seed for that purpose. This mode of planting is, however, only calculated for those districts wherein cotton is cultivated on a small scale, merely for family use. Whenever it is cultivated for exportation, a drill plough ought undoubtedly to be resorted to. I have seen one made so as to deposite Indian corn at such a distance and in such quantity as was required, opening the furrow, placing and covering the corn all at one operation. Such ploughs ought to be used upon the ridges I have described, previously bringing the cotton seed by the use of ashes and water, or by substituting gypsum for the ashes, and a little rubbing, into a state of easy separation. I have tried gypsum in the proportion of a bushel to the same quantity of seed, and was satisfied of its benefit; but the experiment was only made two or three times, on account of the unfavorable nature of the climate where I live for the culture of cotton. If gypsum, as I believe, may be so applied, as gradually to enrich land, then it must ultimately benefit this plant. If its effect in reducing vegetable matter into vegetable food constitutes the mode of its operation, then it is peculiarly adapted to this reduction of the cotton stalks, whenever the same field is successively cultivated. The soil best adapted to cotton is peculiarly proper for the use of the drill plough, as clods or stones constitute the only serious obstacle to it. In good land I plant the cotton at the distance of two feet, and thin it to two stalks, so that it stands at four feet by two apart, with two stalks at a place. But the thickness of the plant must be graduated by the quality of the land. Topping and suckering also, in the climate I am used to, increases the crop and improves the staple. The first is speedily performed by a keen small scythe with a proper handle, and should take place when the cotton has disclosed as much bloom, as it may have time

to bring to perfection. Useless bloom, which it will continue to throw out if permitted, will impoverish the crop, and impair the quality of the wool. The little success which has attended the raising of sheep's wool, in those states adapted to cotton, renders the latter an object of great importance. There is no article of our agriculture, the raising of food excepted, more worthy of attention.

HAY AND FODDER.

Great losses are annually sustained in some parts of the United States in making hay, and in others, in curing corn blades, commonly called fodder. Mine, in a course of many years, have I think amounted to a moiety of the crops; and most of the expedients I have resorted to for avoiding these losses, have been but partially beneficial. Grass loses much both in quantity and substance, by an exposure to the sun in curing it, and fodder more, being thus exposed in small bundles. Both, and particularly the last, suffer greatly by dews and rains. This year I have made the most promising experiment for remedying these evils. A large meadow in bottom land, of a grass called red top or herd's grass, was cut in dry weather, and shocked in large shocks quite green, but dry, that is, not wet with either dew or rain; in the following mode. Four sticks of five feet long, of the thickness of a man's wrist or more, were set up in a square of two feet wide at bottom, and meeting at top in a pyramidal form, where the shock was to stand. One at least of these sticks should be forked at top, to keep them steady whilst the hay is putting round them. A round log, about six feet long and six inches in diameter, was laid upon the ground, with one end reaching to the centre of the two feet square, between the sticks, and the other raised upon a fork about eighteen inches, for the purposes of enlarging the flue presently mentioned, lest it should be closed by the pressure of the hay, and that the log may be more easily drawn out, when the shock is finished. A round and over the sticks, the shock was made, its top reaching two or three feet above the top of the sticks. The purpose of the log was to make a flue for the admission of fresh air into the centre of the shock, and the expulsion of the air heated by the fermentation of the grass in curing. The flues were made to face the point from which the wind usually blows at the time of hay making. If any flues happened to be closed by the pressure of the grass, they were easily opened by a smaller and pointed log; or when the largeness of a shock threatened this inconvenience, it was effectually prevented by inserting into the flue a short forked stick as soon as the log was removed, to hold up the hay. As the logs are removed as soon as the shock is finished, two or three are sufficient, for following a dozen mowers. The hay thus made, is the best I ever saw, and the efficacy of the mode of curing it was strongly supported, by the growing grass under the shocks having been uninjured, whereas I never left shocks so long in one spot before, without its having been killed by the undissipated fermentation of the hay in curing. Corn blades or fodder, sustain an immense loss, even in dry weather, by two or three days' expo-

sure to the sun and dews; and in wet they are nearly ruined. For an experiment, I shocked them in the mode just explained, quite green and dry; but I chiefly allowed them from four to eight hours' sun, before they were shocked. Thus was made the best fodder I have seen. But the weather was favorable. The ends of the blades were laid outwards, and the shocks bound at top by a rope made of the blades.

THE PRESENT AND POLITICAL STATE OF AGRICULTURE.

After all, in these topics, which occupy the twelve first numbers of this book, must the remedy be found for the decreasing fertility of a great portion of the United States, which, if not arrested, must terminate in want, famine, and depopulation. All classes of people have a deep interest in preventing these dreadful evils. The towns are already suffering from mean, dear, and insufficient supplies. The decay of agriculture, and a bad police, are certainly the causes of these conspicuous effects. A bad police produces a fraudulent traffic by slaves; free people of color, and a few bad citizens, discourages honest labor, and compels it to require compensation in its prices, for the risk of theft, or to shrink from the losses and vexations it occasions. So far as the evil is caused by this bad police, the remedy obviously lies in a better. A better can only be effected by laws, which by rendering the products of labor more secure, would tend to its encouragement, and greatly advance the comfort, virtue, and happiness of the community. Of this nature would be laws for protecting live fences. They would prevent wasteful trespasses, produce judicious grazing, increase the quality and quantity of meats, as well as of vegetables, and vastly improve the cadaverous aspect of a great portion of the United States.

But the root of the evil lies still deeper. Why is it, whilst our free form of government has bestowed life and energy on every other occupation, that agriculture alone languishes? Patriotism and benevolence, conscious of this calamity, have unfortunately turned their eyes towards the local projects of roads and canals, which, however desirable, are remedies incapable of reaching the true cause of the calamity; and even capable of aggravating it in some degree, by causing an unthrifty expense, generally oppressive, for the sake of local advantages of uncompensating value. Such undertakings are naturally begotten by a previous flourishing state of agriculture, without which they would be destitute of the food necessary for their subsistence. Success even then must depend upon the interest, economy and industry of individuals. When a republic becomes an undertaker of agricultural improvements, the expenditure of the public money terminates in the same way, as if it should purchase and cultivate a great number of farms for the public benefit. It only awakens efforts for salary, and results in loss and disappointment. The honor or contempt arising from such projects in free governments, is so widely divided, as to leave little or no excitement for labor, and industry in their execution, save what arises from a competition for contracts, and

a struggle for appropriations. Hence the example of a tyrant or monarch, who reaps all he sows, and is therefore stimulated by his personal interest, popularity and glory, is no precedent for us. He, indeed, by his power, can force nature for a time out of her course, raise cities in deserts at the expense of his subjects, or erect stupendous works of art, without a benefit to mankind, correspondent to their cost. But nature should be our guide. This has decreed that a good state of agriculture must precede that which it begets. It inevitably produces, by an easy birth, the best modes of transportation, by awakening the efforts of individuals.

The bad state of agriculture, on the navigable waters, demonstrates that its cause does not lie in any inconveniences of transportation, and therefore I can discern no other cause of sufficient force to produce this visible effect, except the combined weight of taxation, banking and protecting duties, lying heavily upon agricultural effort. The peculiar situation of our agriculture, in constituting almost the only source of national income, and in being obliged to find foreign markets, leaves it almost exclusively exposed to these burdens, because the consumers of that portion of its labors, from which its profit arises, live beyond their reach, and contribute nothing towards their alleviation. They contribute towards the alleviation of agricultural burdens at home. Such is the case with the consumers of the corn, wheat, cotton, rice and tobacco the of United States. The bounties paid by agriculture to manufactures, probably exceed the amount of their contributions. And banking being wholly supported by productive labor, whilst it also withdraws from taxation a great portion of the wealth of the nation, is itself a heavy item of these burdens, instead of sharing in them. In this accumulated pressure upon agriculture is, in my opinion, to be found the true cause of its bad and declining state. I question whether there is an object of taxation so heavily burdened in proportion to its ability, in any other country. Its exports are the only resource for meeting the demands upon it, direct and indirect, and such of its wants which must be supplied by money. The computation in reference to these in the preceding part of this book, is already left far behind, by the rapid accumulation of its burdens, to demonstrate which, the progress of taxation only is exhibited by the following extracts from official reports, from its two extremes and its medium.

By an estimate of the secretary of the treasury (Mr. Hamilton,) of January 1, 1791, the expenses of the federal government for that year, excluding interest on the national debt, and including the extraordinary expense of an existing Indian war, amounted to - -

\$740,232

By his estimate, dated Jan. 23, 1792, including the interest of the national debt, these expenses amounted to - -

3,688,043

By an estimate of the secretary of the treasury (Mr. Gallatin) dated October 24, 1803, these expenses, excluding the interest of the public debt, amounted to - -

2,500,000

By the same estimate including that interest, to - - - 6,300,000

By an estimate of the secretary of the treasury, (Mr. Dallas) these expenses for the year 1816, amounted to - - - \$42,884,269

But deducting all articles supposed by him to be temporary, the permanent expenses of the government amounted to - - - 19,268,669

In 1794 the exports of the United States of articles both foreign and domestic, by official report, amounted to - - - 26,011,788

From these documents it appears, that the expenses of the federal government were above fifty-seven times higher in 1816 than in 1791, and near seven times higher than in 1803. That the ordinary or permanent expenses of the government had trebled between 1791 and 1803; that in 1816, they were above twenty-two times higher than in 1791, and near three times higher than in 1803.

In 1794, excluding foreign articles, re-exported, the native were about \$20,000,000 in value; now they may amount to 40 millions. And it may be assumed as a fact, that the population of the United States has about doubled since 1791 or 1794. If either the increase of people or of exports had graduated taxation, it ought in 1816, to have exhibited only double the amount of the taxes of 1792. But taxes are in all countries graduated by cunning, rapacity and ambition, and in none, by these scales.

The idea, however, of justifying an increase of taxation by an increase of either, is fallacious. It makes people the property of governments and not the wealth and strength of nations. When an increase of people, by producing a greater division of public burdens, diminishes the contribution of every individual,—it is thus, and thus only, an increase of national wealth. But if the contributions of every individual remain as high as before this increase of people, it inflicts an additional degree of poverty upon the former inhabitants, upon whom the difficulty of subsistence is increased by an accession of population, to any given space; and this accession to the expense of subsistence, brought by an accession to the population, is a real loss to the former inhabitants, unless their burdens are rendered lighter, by being divided among more people. But if the burdens of the former inhabitants are increased under the pretext of an additional population, this increase, added to the increased difficulty of living, converts an increased population, which ought to be a blessing, into a curse, and from being a cause of wealth, into an instrument of oppression, and the author of poverty. In like manner an accession to population, used as a pretext for increasing standing armies, produces national weakness, instead of national strength, by the expense of their maintenance, by their gradual transformation into a counterpoise to the nation, and by fostering an unmilitary reliance upon them. Thus, by using an increase of population as a pretext for increasing taxation and standing armies, the maxim, "that it adds to the wealth and strength of nations," is completely reversed, by making it the cause of poverty, and weakness. Let the facts to sustain this reversal, be glanced at. In 1791, our neighboring enemies, the Indians, were much

more numerous than at present, and our own population only half as much. What then can justify a great addition to our standing army, except that the nation is much weaker now than it was then? With respect to taxation, it is still more evident, that an increase of population is made to produce national poverty, when it is considered to what an extent it has been used as a pretext for increasing it, whilst our exports of native commodities and population, have preserved a close alliance with each other. The state of agriculture, in consequence of a reversal of the old maxim, "that people are the wealth and strength of nations," into the new one, "that they are the property of governments," is our increase of taxation for the permanent expenses of government, from \$3,683,043 to \$17,288,669, in twenty four years. Add to this item, the state taxes, the bounties to banks and manufacturers, the increased difficulty of subsistence, and unavoidable private expenses, and it will be evident, that as the far greater part of the total must fall upon agriculture, the demands upon her have, at length, exceeded the whole amount of her share of the national exports. From this cause, therefore, I deduce the bad state of agriculture in the United States.

Another idea has been urged as an auxiliary to that we have just examined, still more fallacious, and equally ruinous to agriculture; namely, "that a depreciation of money, makes it just to increase salaries and taxation." Our agriculture cannot reimburse itself for our local depreciation, because its prices are fixed chiefly by prices abroad. All other interests can, because their prices are not regulated by foreign prices. As agriculture is the chief victim of this local depreciation, instead of redress, to present her with a new calamity, because she is suffering a great one already, is manifestly unjust. Such a doctrine exposes our governments to great temptation. By producing a local and temporary depreciation of an artificial currency, and making it a pretext for raising salaries, and then removing the device, they might make what stock-jobbers call "a good speculation." An occasional temporary advance abroad of agricultural prices, would also furnish them with frequent pretexts of the same kind; and as the salaries are never diminished because agricultural prices fall, the effect to agriculture, from nominal high prices, produced by a local depreciation, is a real increase of taxation, and from temporary high prices, a permanent increase of taxation; so that high prices of all kinds, instead of relieving her, are only in the end an aggravation of her oppressions. The case of a famine displays their pretext for increasing salaries in its true countenance. A famine of bread, tobacco, cotton, or rice abroad, or of specie at home, will cause an increase of prices. Are such famines, particularly the last, good reasons for increasing salaries? In like manner, prices will rise as the fertility of land diminishes. Does the remedy lie in taxing these lands higher, the poorer they become? But if the fluctuation of prices is a proper rule for graduating salaries, then a fair reciprocity between the government and the people, requires their reduction when prices fall, as well as their increase when prices rise, in order to comply with the rule itself; yet governments never remember this pretended principle, when its application is in favor of the people.

It is further said, that salaries ought to be graduated by a reference to the computed value of the acceptor's time, and that high salaries obtain the most merit and talents. Under the first idea, every member of a legislature ought to have a different salary, each man's time being of distinct value; or if the salaries are to be alike, however different each member's time may be in value to himself, then to do justice to a few whose time may be of great value, a manifest injustice must be done to the public, by giving equal salaries to a multitude, far beyond this value. And therefore if this idea should regulate salaries, it is not improbable that those who pay themselves may highly respect the motive of compensating a few great men for their time, whilst it will also amply appreciate their own. But this rule for compensations can never be observed. The public service most detrimental to the personal and private affairs of individuals, is that of the militia. Compare the risk of life and health, and the loss of time often necessary for the subsistence of a helpless family, with the sacrifice made even by the most eminent member of congress; or compare the mass of suffering in both these lines of public service. Is it not obvious that this rule for compensations, neither has nor can be fairly carried into execution.

Whether high salaries invite talents and open the door to merit, is a fact depending upon history. From this, truth seems to me to lie in the reverse of the propositions. They appear rather to have excited rapacity, and opened the door to arts for gratifying ambition and selfishness. The case of the British parliament is, I think, unfortunately cited to prove the affirmative of the proposition. And to make it answer this purpose, an assertion that its members receive no compensation, is coupled with the citation. But the truth is, that these members do receive, by pensions and offices, compensations so enormous, as to have produced a disregard for the direct moderate compensation, and yet to have awakened all the energies and frauds of avarice and ambition to carry elections, and to acquire the fruits of success. Has the great profit arising from a seat in the house of commons, carried into that body merit and talents, or artifice and corruption? If the English parliament should now endow themselves with a high direct compensation, retaining the indirect compensations of executive patronage, would it be purged of corruption, and regenerated into patriotism? This would place it nearly in the state of our congress. At home it is such, whether more merit or talents have appeared in legislatures, as they have been more amply replenished with wages and patronage, the chance of drawing a prize from which, is often valued even here more highly than the direct wages. As to the argument that high wages open to the poor the door of dignity, it is only the plausible pretext of those pleading for an increase of their own income, at the expense of the poor whom they pretend to favor.

Another argument remains of itself sufficient to destroy the policy of high wages, and its effect, heavy taxation, if all those hitherto urged were feeble. They beget inveterate parties and factions which successively resort to every plausible pretext for increasing their income and power; transmit to their successors precedents which operate

as salves for conscience, and poisons for patriotism, and universally terminate in the subversion of a free and moderate government.

Some principle, by which to settle the important question of wages, is still wanting, capable of guarding the people against temporary pretext, and individual selfishness; and it seems to me to reside in the following ideas. Public servants are either public property or mere hirelings. In the first character they owe something to society beyond the services purchased by wages. This debt is due for the multitude of benefits derived from society, and ought therefore to constitute a greater portion of their compensation, as the government is freer. To the militia it constitutes the chief compensation for their services. What can be more manifestly unjust, than to make social duty the chief compensation for the hard sufferings of militia services, and yet to bestow on civil services a compensation capable of exciting faction, avarice and ambition, and of gradually destroying those blessings purchased by the great body of the people by the greatest sacrifices, almost gratuitous? If public servants are to be considered as mere hirelings, then the principle ought to be extended to military services, and in both cases, the public and its servants ought to be considered as free contracting parties, and in both the price of the commodity ought to be settled by the rate of the market, by a mutual agreement. But as the militia are coerced, and as civil public servants possess the valuable and exclusive privilege of refusing to serve, is it not highly unjust to the nation, to give a price for the commodity, not only higher than the same thing, of a quality as good and even better can be bought at, for the end of killing its free and easy government by a poisonous plethora of expense and taxation. In my opinion, high salaries, by awakening avarice, faction and intrigue, have a tendency to destroy a sense of duty, virtue, honor and patriotism; and that low salaries have universally produced the best public servants. I conclude that salaries ought to be graduated by the public good, and not for the benefit of individuals.

Taxation ought to be governed by some principle, and when understood, this principle ought to be enforced by the people, to shield themselves against those frauds of faction, avarice and ambition, used in modern times to steal the liberties of nations, in lieu of the braver modes resorted to by the tyrants of antiquity.

What, it may be asked, have these remarks to do with agriculture? The answer must depend upon the opinion of the reader. Should he think with me, that the burdens heaped upon it constitute a chief cause of its decay, nothing can restore to it health and prosperity but its own knowledge of this fact, by which it may be induced to remove some of the pressures under which it is languishing; and therefore none of the subjects of this book, can be more instrumentally connected with the prosperity of agriculture. In England, the pressure upon agriculture and manufactures is defended by armies and the difficulties of emigration, yet it is sorely felt; here, where the inferiority of soil renders it much less capable of bearing this pressure, the same arts of taxation and paper frauds will, I fear, produce still more calamitous consequences.

NOTES.

[Note A.—Page 717.]

Upon a review of the foregoing essays, originally offered to the public in a newspaper, without foreseeing that they would appear in a book, a few expressions have been expunged, lest their political doctrines should be ascribed to party motives. These proceeded from an opinion, that the inculcation of sound political principles, was the only mode of avoiding the evils incident to a blind zeal in favor of the projects of any set of men exercising power; or of preserving a consistency between professions and actions. To a union between public interest and public knowledge, the world is indebted for the benefit it has derived from the Grecian and Roman republics, and to the want of such a union, the regions which once sustained them, for their present state of slavery. No association to inflict or to avoid oppression, can succeed, if it is ignorant of the means for procuring success in both objects. Political knowledge is as necessary to the people for one end, as to princes, orders, factions, and usurpers for the other. Without it, the lords of the soil in the United States, must gradually become the slaves of some legal aristocracy; and, exposed by political ignorance to the rapine of an endless catalogue of exclusive factitious interests, would soon resemble monkeys stripped by the superior intelligence of man, of diamonds they had dug out of the earth. As agriculture, with its dependencies, almost covers the whole public interest of the United States, so degrading a consequence of its political ignorance, demonstrates how intimate its connexion ought to be with politics. The first produces; the latter secures. Exclusive political knowledge, creates exclusive legal interest. A complete agricultural treatise would comprise the soundest agricultural principles, chemical, experimental and political; and the inutility of the two first items might be more plausibly asserted, because they only teach men how to labor, than that of the last, which teaches them how to live happily.

Funding, legal enrichment of all kinds, and the perpetual effort of those who exercise power to increase it, may here, as every where else, enslave the majority and the public interest. By funding only, agriculture may be soon made tributary to the dealers in credit, chiefly located by the nature of their employment in a few large cities. The dispersed situation of the agricultural and of every general interest, renders its share of the vast acquisitions to be made by the credit trade, trifling; and the circumstance of its constituting the chief item of the general interest, renders its share of the contributions to support it enormous. It is a trade for getting premiums and interest without money, upon the credit of those who pay both; and for inflicting an annual tribute on those who have the credit, until they prove its goodness by paying coin for paper. If agriculture or the public interest borrows ten millions in paper notes, furnished by the partnership between banking and funding, at a premium of ten per centum, and an annual interest of six, in fifteen years it pays a sum in specie equal to the debt, but both the debt and annual tribute still remain. The public interest cannot transform itself into an exclusive interest for carrying on this credit trade, because it must be the payer not the receiver; nor can it have any thing of consequence to lend, because the projects requiring loans, incapacitate it for a lender, especially so far as it is agricultural. A liability to pay, and an inability to lend, generate exactly the same relative situation, between these two interests, which subsists between two nations, when one is tributary to the other. Upon the credit of this liability, that of the paper loaned to governments, depends. The government in fact gives the public credit to associations for vending paper stock, which these associations sell back to the govern-

ment for a good premium and a perpetual interest, for which premium and interest the only consideration they pay, is an adherence to the will of the donor, against the will of the public interest, by which the donation is paid. The impoverishment produced by this species of tribute, is demonstrated by the difference in the price of products in the paying and receiving districts, by their different agricultural appearances, and by emigrations. The effects of a tribute, collected in distant provinces, and expended at particular places, are uniformly the same, inflicted either by a tyrant or a patriot. Ought not agriculture to understand this political machine?

An amendment of the constitution for empowering the general government to tax exports and to make local regulations, would comprise a boundless power of sacrificing agricultural and exporting districts to the interest of credit dealers, to transitory political projects of men in power, and to the passions of non-exporting districts; and although the apparent favors to the latter would be delusive and entrapping, they would suffice to divide agriculture itself, into two parties neutralizing each other's defensive ability, and to subject both, like all large inert bodies, to less powerful, but more intelligent and active exclusive interests. Ought it not to understand political principles to meet occurrences of this kind?

As no interest covering the majority of a nation can avoid oppression, except under a free form of government, because the end of every other form, is to foster partial interests, should not agriculture be able to see the importance of maintaining the division of power between the general and state governments? The latter are her intimate associates and allies. The general government is already in a far greater degree the associate and ally of patronage, funding, armies, and of many other interests subsisting upon her. If it should by new powers be enabled to enlist still more of such dangerous auxiliaries, or to break over the boundary between general and local concerns, in a single place, the breach will produce consequences similar to those produced by that of the Tartars in the great wall of the Chinese.

A fanatical love or hatred of individuals or parties is equally inconsistent with a free form of government. Political enthusiasm enslaves parties to leaders, as religion enslaves sectaries to priests. Politicians never love or hate from passion. All their enmities and connexions flow from interest, according to which they reconcile or break them, without any of those sensibilities excited in ignorance by its own imaginary idols. As this idolatry is a universal cause of oppression, should the truth be concealed from agriculture, that she may become the victim of that enthusiastic confidence, which falsehood and mystery only are able to inspire? A political bigot is as certainly the slave of some party leader, as a religious bigot is of some priest.

These few cases are cited to show, that agriculture, without political knowledge, cannot expect justice, or retain liberty. The correctness of the political opinions expressed in these essays is another question. The author has suggested such as his mind suggested to him, to awaken agriculture to the importance of this species of knowledge to its prosperity and happiness, that it may by its own understanding detect his errors or its apathy.

[Note B.—Page 719.]

The slave-holding states have been deterred from making agricultural improvements, and establishing any tolerable system of police for the management of slaves, by the lazy and hopeless conclusion, that the destruction of their lands, and the irregularities of their negroes, were incurable consequences of slavery. A

refutation of these errors must precede the possibility of any considerable agricultural improvement. The first is occasionally detected by the rare efforts of individuals. But these can never make a wide and lasting impression, whilst they are defeated by the second. This obstacle can only be removed by legislative power. Until a better police for the regulation of slaves is invented, than has hitherto existed, no considerable improvement can possibly take place in a system of agriculture to be executed by them. A bad police will for ever draw back agriculture with more force, than individual exertions can drive it forward; nor can the most violent efforts overrule its baleful influence, any more than the destruction of a tyrant can overrule bad principles of government, and extract liberty from the causes of oppression. The creation of a free negro class has been noticed as a great defect in this police; but its defectiveness in relation to the slaves themselves was overlooked. Nothing effectual has been done by law, for controlling the irregularities of the slaves or the errors of their owners, by which a multitude of mischiefs to themselves and others are produced, together with the ruinous national misfortune of an impoverishing and depopulating system of agriculture. As the remedy for these evils lies only within the reach of law, it is the duty of the government to find it. Should it require a farther limitation of the prerogatives of ownership, public and private good will unite in their recommendation of such a measure. As the laws now stand, an owner, by withholding from his slave even a necessary subsistence, may compel him to steal it from others, and thereby increase the profit of his labor; or he might drive him into the resource of absconding, and prowling like a wolf for food. Ought the prerogatives of ownership to inflict such unjust calamities upon a free people? Are they not infinitely more grievous than the ancient royal prerogative of purveyance? One grievance robbed openly, the other robs secretly; one was subject to some legal regulation, the other is subject to none; one paid something, the other pays nothing. Can agriculture or industry flourish here under the burden of having an infinite number of roguish and runaway slaves living at free quarter upon them, when they could not in England bear the purveyance of a single king? The slave himself may have imbibed, from a vicious disposition, a habit of indiscriminate theft, so ruinous and disheartening to industry; nor can any excuse justify his robberies from the innocent. The insufficiency of the laws to correct these evils, will be discerned by comparing the number of such robberies, with the instances of their receiving any species of punishment. The object of punishment is to deter by example, and not to gratify this passion of revenge. But this trivial risk amounts almost to the encouragement of impunity; and leaves only to the public that security against the thefts of slaves, arising from their love of moral rectitude, without any apprehension of punishment. Agriculture in the slave states is every where languishing under this mortifying and consuming malady. She possesses no moveable which she can call her own. Bleeding continually under these numberless scarifications, legislatures continue to act towards her like surgeons who should desert a patient covered with wounds, because he was not quite dead. It would be better to cure her by protecting her property. A law, compelling the sale of every slave who should run away or be convicted of theft, out of the state, or at a considerable distance from his place of residence, would operate considerably towards correcting these great evils. If its execution was insured, as might easily be effected, it would strongly influence both the master and the slave; it would only retrench in a very small degree the prerogatives of ownership, for their common good, and it would render the remaining mass of those prerogatives infinitely less detrimental to national prosperity.

[Note C.—Page 728.]

The foregoing essays having been written several years past, subsequent experience has made some change in a few of the author's opinions. Those in relation to the essential article of manuring are stated in this note.

The extent of surface now manured upon the same farm, by a more careful employment of the same resources, has so far exceeded his expectations, as to have transferred his preference as means of improving the soil from inclosing to manuring, without however lessening the value of the former in his opinion. A field of two hundred acres aided by both, produced last year a crop of Indian corn averaging fifty bushels an acre, and another of eighty, aided only by inclosing and gypsum, a crop of twenty-five. The first being nearly double, and the second, one third beyond their respective products when last in culture. Under a diminution of the stocks quoted, the surface manured last year exceeded a hundred acres, and will this extend to one hundred and thirty. It is contemplated to extend it, until it reaches annually a space sufficient for the whole Indian corn crop of the farm. The regular increase of crops furnishes additional vegetable matter; the chief basis of this rapid improvement. Tull's position "that ten cultivated acres, will not produce the means of manuring one" is quite erroneous. Four acres already produce offal capable of manuring one, from the corn and wheat crops, exclusive of the bread stuff they produce for sale. By removing the cattle and sheep early in the spring from the farm pens, and forbearing to return them thither until late in the fall, the space manured by penning is greatly extended, and the manure raised in the farm pens but little diminished, because its quantity is regulated by litter. This is in a small degree diminished by extending the period of penning, and as both cattle and sheep will require some food, early in the spring and late in the fall in these pens, the litter arising from that food will enable the farmer more frequently to remove the pens at these seasons, whilst a mixture of various manures causes a greater benefit to soil. These pens on removal are fallowed in high ridges five and an half feet wide, and those thus treated before the middle of August, if the land is strong, cover themselves with a heavy coat of grass, furnishing a fine pabulum for a bushel of gypsum to the acre, to be sown thereon. This cover, by reversing the ridges, is completely buried, and bestows on the ground a second valuable manuring. The hog pens are managed in the same way, excluding the litter, not because it would be useless, but because it is used otherwise. For these, stiff cold soils are selected. Thus the same stocks have been brought to manure by penning, nearly double the surface quoted. In the winter, all the farm pens are littered daily and copiously with corn stalks. Each ten ordinary sheep will by this means, exclusive of the summer's penning, raise manure sufficient for one acre; and that raised in the stable and its yard, and in the farm pens of the cattle, calves and fattlings, has sufficed to produce the result stated in this note. Instead of applying the corn cobs in the former mode they are weekly scattered in the pens or stable yard to preserve them from the fire, where they absorb a rich moisture to be bestowed upon the earth as they gradually decay; thus constituting a valuable addition to the manure, and saving the labor of their separate removal, and more tedious application in the former mode. The augmentation of manure thus produced, requires a commencement of its removal early in March, and by appropriating a small portion of the labor of the farm to this object for one month before the commencement of corn planting, that left to be subsequently carried out will be finished in good time. The holes for depositing the manure are more judiciously arranged under the direction of a person on horseback, (whose elevation and sole attention to that object will

enable him accurately to distinguish the variations in the quality of the land, and to bestow the manure accordingly) than by the laborer who walks, measures, and digs. By equalizing the fertility of a field, the crops are increased, because it bestows on the whole surface a capacity to sustain the same quantity of seed, and renders unnecessary a multitude of discriminations too intricate to be correctly made. The rider pronounces aloud the number at which the walker is to make each hole, extending or contracting the distance according to the variations of the soil; and the walker counts aloud his own steps to this number, at which he digs a hole as a mark for depositing each load of manure. To a farmer, this occupation furnishes an agreeable mental amusement.

Two great errors in relation to the use of corn stalks as manure are prevalent. One, that they ought to be trodden to pieces; the other, that when it is too late to effect this, it is good management to gather and lay them in the furrows, to remain uncovered for a year or two. When the stalk is saturated with the moisture of the farm pen, it has acquired all the fertilizing principles it can hold, in that state. It acquires none from being trodden. Its porous texture enables it speedily to absorb what it can contain. After this is effected, it is only necessary to bring it into a putrescent state. When the stalks are all in, this is soon done by covering them with straw, chaff or tops. It will not require above ten days in the common March weather, after a rain. Thus they will be made sufficiently soft and brittle to raise, spread and plough well in. Their richness as a manure will be discerned by their capacity to extract salts from the atmosphere whilst moist, after they are raised, in a quantity sufficient suddenly to change their color. The excessive waste or loss they sustain, left in furrows on the surface, arises from the same quality by which the rich moisture of the farm pen throughout the winter is absorbed and saved; namely, their extreme porousness. Their surface is dry, nothing evaporates, and nothing runs from them, if the depth of litter is as considerable as I make it. As absorbents, no litter equals them; but exposed on the surface, they suffer more than any other from evaporation.

A common question discloses another general error in relation to manuring. When the surface manured is stated, an inquiry after the number of stalks follows. We shall never succeed to a great extent, if we consider animal manure in any other light, than as a kind of sugar to sweeten the copious repasts of vegetable, with which we ought to feed the earth. It may also, mingled with vegetable matter, dispose the mass, at particular periods of its putrescency, to extract salts from the atmosphere. But however useful it may be, the epithet "animal" is only to be admitted connected with a recollection of its origin. This is vegetable matter, of which animal manure is only a remnant, having undergone one or two secretions, and the diminution arising from animal perspiration. Vegetable matter therefore is the visible origin of manure. If atmosphere is its source, that can only be reduced to a visible substance by vegetable instrumentality. Manuring must consequently be regulated, not by the number of stocks, but by skill and industry in raising and applying vegetable matter. Let us then banish from the agricultural dialect this misleading question; which blinds us by insinuating a falsehood; and substitute for it one, which discloses truth, the thorough belief of which must precede agricultural improvement. The correct question is "how many acres do you manure for each laborer employed on the farm?" It took me more years to reach one, than to exceed four, and my stalks were rather diminished as the space manured increased. During the first period, the delusion of the first question misguided my efforts; during the second, they were directed to the raising, preserving and applying vegetable matter in the most beneficial mode I could. How far manuring may be carried, is

not to be foreseen, but I think I can discern through the remnant of the mist which long hid from me the idea of its being pushed to four acres for each laborer, a possibility of its being extended to double that quantity.

In this calculation I exclude gypsum, lime, marl and inclosing. The more valuable auxiliaries they may be to our vegetable resources, the more our success will be accelerated. Vegetable matter only can bestow on gypsum a boundless fertilizing power, and perhaps it may be also a necessary associate of lime and marl, with neither of which I have been able to make any satisfactory experiments; at least, the universal capacity of creating it every where in great quantities, establishes its vast superiority over every other species of manure; and designates it as the basis of agriculture. Applied in green bushes it is much more beneficial in curing galled declivities, than animal manure. I use it with great advantage for that purpose, and also for manuring level land in the following mode. The brush is laid in furrows, made in cultivating corn, as deep and wide as explained in these essays, moderately thick and then cut to make it lie close, that it may not be removed by the winds. There it remains uncovered for three years. By applying the brush, the winter succeeding the culture of the land in corn, in a course of four shifts, it is ready for the plough at the proper time. Even the ridges, as well as the furrows, will be highly improved by the brush, from the scattering power of air and moisture. These ridges, on the fourth year, are reversed to cover the brush, by this time in a putrescent state, and thus prepared to rot under ground. The objections to the other modes of using brush wood, which I have tried, are these. Spread over the whole surface, it does not rot sufficiently in three years to admit of being ploughed in, without greatly encumbering the plough. Left sufficiently long to avoid this inconvenience, much time is lost without any retribution; and much of the manure during the latter period of its decay, by evaporation. Drilled green and speedily covered with earth, the wood will not rot under ground so as not to incommode the plough when the ridges are reversed in the fourth year afterwards. This preservation of the wood diminishes or delays its efficacy as a manure. Drilled green, lying uncovered three years, then covered by the plough without disturbing it, and lying four years more until the ridges come in course to be reversed, the wood is made useful as a manure, without producing these inconveniences. I have used all kinds of brush wood, but chiefly pine and cedar. The latter are preferable in a small degree to other green wood, when both are applied in the winter, because of their leaves. A confidence in the benefit of this mode of manuring, has induced me this year to cut down a thicket on the broken ground of a creek around a level field, and to apply the brush to the furrows of the weakest parts. All wood of above two inches diameter was used as fuel. The residue bestowed a handsome dressing on double the surface it grew on. The land it came from was not capable of cultivation, and the growth was lean. Being enclosed, it will rapidly grow up thicker, and afford periodical cuttings for the same purposes. The wood pays for the labor, and the manure necessarily disengaged from the fuel wood, is an additional donation from such lands, (in which we unfortunately abound) capable of extending our means for manuring very considerably, and of conveniently improving fields inconveniently situated for folding or farm pens.

[Note D.—Page 736.]

Instead of laying the plough aside, until the first hand-hoeing of Indian corn takes place, it is probably better to run a deep furrow with a large plough drawn

by two horses, and having a long mould board, on each side of the corn, immediately preceding this hand-hoeing. As the corn is very low, this furrow must be run so far from it, that the earth raised by the mould board will not quite reach it, but be left on each side, so as to form a narrow trough on the ridge in which the corn stands, to be filled up by the hand-hoeing immediately following this furrow. The hoe will have little else to do, and two thirds of the labor usually attending this operation will be saved. It is better performed. The deep furrow destroys all the grass in its range. In rows five and a half feet wide, the earth moved by the helve on the left of the share, meets and covers the grass in the water furrows between the ridges. And the earth thrown up by the share and the mould board towards the corn, is used to stifle the grass in the trough on the top of the ridge and about the young corn. A hand-hoeing in the usual way is infinitely more laborious, and in humid seasons, from its shallowness, infinitely less effectual in destroying the grass, whence it is often enabled suddenly to take root and to grow with renovated vigor; somewhat similar to the effect of scarifications applied to green swards even of wheat. The deep ploughing of this suggestion, its acceleration of the first hand-hoeing, and its suppression of the grass whilst it is young and weak, by a cover of earth, will both obstruct this misfortune, and enable the corn to reap great benefit from the genial weather which occurs in the early part of the summer, instead of often being destroyed by it.

If Indian corn is a crop of such value, as it is supposed to be in these essays, the selection of the best species is an object of importance. The little said of this, arose from the necessity of the different climates of the United States for different kinds. But the vast number of varieties abounding in the same latitudes, disclose a want of spirit for fixing so important a preference as that of the best over the whole rabble, by careful experiments. Those which I have made have inculcated the opinion, that the species which combines the three circumstances of producing the most stalk, the largest cob, and the longest grain, is the best for the latitude of 38 degrees north. The small flinty forward kind, producing from two to six ears on a stalk, inspired the most hope, and produced the most disappointment of any I have tried. Its superiority of weight was counterbalanced by many disadvantages. Early kinds are unexceptionably dwarfish, and the latest I have procured has the largest stalk. The length of the grain, supposing the cob to be equally long and large, decisively settles the superiority of farinaceous product. The longest and the thickest cob, if the length of the grain is equal, produces the most corn. The size of the stalk is important, if vegetable matter possesses the high value contended for in these essays, and if it is chiefly extracted from the atmosphere. The size of the plant produces some economy of labor, besides augmenting our drafts from the fertilizing atmospherical treasury, because we can gather far more grain, stalk, blade, top, shuck, and cob in the same time, when the plant is large, than when it is small. I have discovered no good reason for a recent preference of yellow to white corn, except that a foreign fashion causes the former at this juncture to sell best, nor any benefit from several trials of planting seed saved from twin ears. In the before mentioned latitude, corn constantly pushes out barren shoots, or more than it can fill with grain, which probably serve to impoverish such as succeed. If so, there would be no advantage gained, could we increase their number by planting from twins.

[Note E.—Page 74S.]

The mode of raising hogs has continued to attract my attention, on account of the vast importance it

derives from its connexion with live fences. If it can supply us with meat, without obstructing an improvement, by which the agricultural state of the union would be more benefited than by any other, its usefulness would be great; but if it will also supply us with more meat than the present mode, no legislature will much longer suffer a state to languish under the evil of dead fencing, for the sake of diminishing both meat and bread. Sensible of the enthusiasm with which human nature embraces all opinions it ardently wishes to realize, I have endeavored in these essays to confine myself to the decisions of experience, and to avoid the delusions of hope. My experience of the recommended mode of raising hogs, has for several years resulted in a far more plentiful supply of pork without purchasing, than I could previously afford to obtain by purchasing. It has also as strongly convinced me, as I can be convinced without an exact experiment; that the expense of raising it is reimbursed, or nearly so, by the manure of the hogs; and that the alternative for public preference, really lies between an expensive and insufficient supply of pork, accompanied with dead fences; and an expenseless and sufficient supply of the same article, accompanied with live. The recommended mode of raising hogs is improved, by reserving a sufficient number of breeding sows to insure the dependence upon those under one year old for keeping up the stock; by separating the large and small hogs in cold weather, to prevent the latter from being smothered; by increasing the size of a pen for one hundred of different ages, to an acre; by removing it once a fortnight; when the hogs are constantly confined, or every four weeks, when penned of nights only, and instantly ploughing up the ground in high five feet and a half ridges, to be reversed when cultivated; by soaking corn until it is sour, in a number of barrels sufficient to provide in succession, according to the warmth of the season, their chief food in this state; by giving them the sour water to drink as each barrel is emptied, by a small allowance of any vegetable food after the pumpkins are expended; (they will eat cornstalks in the early part of the winter) by penning them without rings if such food is scarce, on ground well covered with any kind of grass the roots of which will contribute to their health, whilst they prepare the land for the plough; and by using them in the same way to eradicate the garlic, than which no food is healthier.

[Note F.—Page 749.]

Since these essays were written, my experiments in cedar hedging have become two or three years older, and have removed every doubt of its cheapness, practicability and importance. They were commenced by planting a single row of cedars on the inside of a fence two feet apart, about eight inches below the summit of the bank of a ditch. The errors of neglecting to cultivate the young plants, to crop or to manure them, and to plant a second row on the outside of the fence, were for several years committed. Struggling with hungry rivals for a scanty food, they grew slowly, were meager and spindling. The lower branches began to perish from omitting to check the perpendicular growth by cropping, and the hope of training the cedar into a hedge seemed almost desperate. Though the land is generally poor, manuring (a small dressing with bushes excepted) has hitherto been neglected. But topping, clipping the lateral branches, culture, and filling gaps by bending into them and covering boughs to take root, leaving out their ends have been imperfectly practised for two years. Another row of cedars has also been planted on the outside of the fence. The old hedge has been so highly improved by these inconsiderable aids, as to have assumed a handsome appearance, and to promise a speedy exhibition of a large farm inclosed by a live fence.

The cedar planted in a good soil, well manured and properly cultivated, cropped at one year old and annually, so that it rises only as it spreads; and clipped at the ends of its branches, those excepted buried about their middle to fill gaps; will thicken near to the ground like box; and after it is brought to the intended height, by raising the bank of the ditch, will be in close contact with it. My experiment has been more imperfectly made from the circumstance of its embracing at once a large farm; made upon a smaller scale and more skilfully, an example would speedily appear, which would be ardently copied.

Green pine or cedar brush has been used as a dressing to the hedge as follows. The earth is shaved downwards on each face of the bank of the ditch, so as just to take off the grass, and not to injure the roots of the young hedge, and left in a ridge. The brush is laid in a line with the hedge eighteen inches wide, so as to cover the ground. After it is in danger of being perforated by weeds or grass, the ridge of earth shaved down is thrown upon it. To the other benefits of this process, that of protecting the young cedars against the sun, which strikes the face of banks with great force, is to be added. In some situations this protection is indispensable. By drawing down and returning this mixture of earth and brush alternately, as the hedge requires weeding, it receives both manure and cultivation, at a very trivial expense of labor.

No doubt can exist, that the thin population of a great portion of the United States proceeds from the poverty of the soil, whether it be natural or artificial. In the latter case, patriotism ought to sicken with the anticipation of the censure which posterity will see written in the face of the country. These words will be engraved on it: "Your ancestors, like Indians, prove their regard for the children by scalping the mother." In the former, is it wise, patriotic or pious, to neglect the means for its improvement? Live fences attended with apple trees would, I have no doubt, more than double the population of the eastern sandy portions of the United States. Let the reader compute before he decides upon this opinion, and test it by figures. The savings of wood, of labor, and of the expense in foreign liquors, are items going to an increase of population, because these savings must be carried to some productive object for its sustenance.

The conversion of the brushwood now lost in making dead fences, into manure, is a smaller item of the same nature. But the single advantage of securing to agriculture the benefit of making a permanent and constant use of atmospheric manure, arising from the security of live enclosures, alone suffices to sustain the opinion. By gradually spreading fertility over barrenness, inclosing will increase population to an extent commensurate with its own progress. For a system of closing the pores of the earth against the inhalation of those qualities of the atmosphere, by which its surface is fertilized, it will enable us to open them. Wealth instead of poverty; national strength instead of weakness; and perhaps liberty instead of slavery, march in the train of permanent inclosures. But we are blinded against computations founded in figures, by comparisons arising from superficial prejudices. Beggary admires the luxury of competence, and mediocrity chuckles over her wealth, when she beholds poverty. So we draw opinions concerning the fertility and improvement of a whole country, from comparisons made among ourselves, always shedding darkness upon truth, because always influenced by several of the worst or weakest passions of human nature. To provide prosperity for nations by the cool calculations of reason, and not to devote posterity to wretchedness from the odious prejudices implanted by such shallow comparisons, constitutes the duty of legislatures, and the real virtue of patriots. The appalling difference between the average product of wheat in this country and in England, ought to dissipate our delusion as to the present quality of our soil, to awaken our inquiries

after the causes of an inferiority so deplorable, and to rouse all our capacities in search of a remedy. Our wretched, expensive and ineffectual mode of inclosing is in my view the chief of those causes. No history has preserved, and no country exhibits, a good system of agriculture in union with dead wood fences. Homer, in his description of a Phœæian garden, informs us, that *green fences* were understood and used in his time.

"Four acres was the allotted space of ground,
"Fenced with a *green inclosure* all around,"

He mentions stone and thorn inclosures, selects the green to adorn his most splendid horticultural scene, and is utterly silent as to dead wood fences. Were they exploded above three thousand years ago, to be now revived as an evidence of man's rotary disposition? But we need not dive into antiquity, nor travel over the globe to settle the question. At home we see the waste of soil graduated from north to south, by some inexplicable circumstance, distinct from original fertility. The different modes of fencing is probably that circumstance. In Connecticut, I have seen many fields apparently so naturally poor and stony, that I could never account for their fertility, until I discovered the advantages of permanent inclosures, and recollected that they were surrounded by stone fences. Prejudice, sustained by conscience, is too strong to be subdued by reason, and too respectable on account of its honesty, to deserve contempt. Yet it ought to be persuaded by its senses, and to be induced to follow its own interest by the plainest evidence. Though at length convinced through its eyes, of the benefits arising from inclosing, it will not be convinced through its mouth, that the old mode of raising meat by ranges (as they are called) is insufficient for the supply of a thin population, and that the effect of its conviction of one error is defeated, by its persistence in another. Dead wooden fences are too transitory, too subject to imperfections arising from idleness or accident, and too easily impaired by thoughtless or malicious trespassers, to guaranty to a nation the benefits of an inclosing system. They are here to-day and gone to-morrow. Live, possess the rights and the respect of a freehold. Attached to the soil, they soon efface the unjust and ruinous prejudice, nurtured by their evanescent rival "that arable lands, when out of actual culture, ought to be turned into a common." This opinion, suggested by a national wish to obtain good and sufficient supplies of grass, and gratified throughout a great portion of the union, as a wish for such supplies of horses, would be gratified by throwing open every stable to all who wanted them) is undoubtedly entitled to denunciation as a prejudice; if prejudice exists among mankind.

My wish for a better understanding was never stronger than in considering this subject, from a conviction that its gratification could never have been more useful to the public. Throughout the world, countries inclosed by stone or live fences, and those inclosed by dead wood, exhibit the contrast between cadaverous decrepitude and blooming youth. The richest country of Virginia below the mountains, painted on the same canvass, would be a foil to the poorest of Connecticut. The incapacity of the first, for rendering inclosing subservient to the improvement of land, by excluding ruinous or injudicious grazing; and the capacity of the latter to avail itself of this agricultural panacea, is a chief cause of the contrast. In Britain, live fences are substituted for stone, where the latter is not to be had, and often preferred to it; and are by wide experience demonstrated to be a sound sponsor for an excellent state of agriculture: here, the demonstration that dead wooden fences ensures a bad state of agriculture is as wide. Does truth require more than two demonstrations?

If permanent fences are indispensable for the purpose of changing the state of our agriculture from bad

to good, they are also necessary for the preservation of our happiness. The portion of liberty and happiness enjoyed under the expensive system of government existing in Britain, is owing to the productiveness of labor; and not to the operations of the paper, patronage party, and official conspiracy for pilfering that labor as the ingenious conspirators pretend. Though her average product of wheat is thirty-five bushels, worth at least one hundred and five dollars, she finds it better to convert so much of her land and labor to the still more profitable objects of raising wool, cheese, meal, with other agricultural products, and to manufacturing, as to have occasion for the importation of the bread-stuff. To this great productiveness of labor it is owing, that she is the happiest and freest country of Europe, under the greatest load of pecuniary expenditure. In the United States, agriculture must for ages graduate the productiveness of labor, in spite of the projects of statesmen, and the fallacy of stock-jobbing. If we rush into English extravagance without gaining the productiveness in that occupation which must feed it, the majority of the people must be speedily ground down to a degree of poverty, below an ability to preserve a free government, or to acquire personal happiness. Let us therefore provide the foundation, before we rear this splendid superstructure, by abolishing a mode of inclosing lands which produces nothing, consumes a great portion of our labor, and by impoverishing the soil, daily diminishes the productiveness of the residue.

[Note G.—Page 760.]

A date being necessary for estimating the opinions contained in the foregoing essays, the reader is informed, that they appeared in the ephemeral columns of a newspaper, before the year 1810, and that the notes were written in the beginning of the year 1814. Though the last number was better calculated for the place of its original appearance, (as well as some other parts of the work) than for that it now unexpectedly occupies, it is suffered to remain, because, however light, it is true; but lest its tone may infect its matter, it seems proper to advert to the same subject more seriously.

Society is unavoidably made up of two interests only, in one of which all special and particular modifications of interest are included; namely, one subsisting by industry; the other by law. Government is instituted for the happiness of the first interest, but belonging itself to the second, it is perpetually drawn towards that by the strongest cords. Therefore, unless the first is able very accurately to distinguish between laws calculated to do it a benefit or an injury, it must be gradually sacrificed to the appetites of the second, because government, a member of the second, legislates. All men enjoying honour, power or wealth by law, or striving to acquire either through that channel, are like coin struck with the same dies. The engravers, avarice and ambition, constantly mark the same etching, and the aqua fortis, self-interest, indelibly imprints it on the human mind. From this fact, the preference of a republican government is deduced, as calculated for checking the natural disposition of legislatures or the government, to favor the minor class, composed of legal or factitious interests, at the expense of the major class, composed of natural interests; including all who subsist, not by means of legal donations, but by useful talents in every form, such as those employed in agriculture, manufacturing, tuition, physic, and all trades and scientific professions. The propensity of law to sacrifice the great or natural interest of nations, to the class of little or factitious interests, arises from two causes; one, the government being the matrix of the latter, views her progeny with

the eyes of an owl, and considers them as beautiful; the other, that although law can enable the small class to live on the great one, it cannot enable the great class to live upon the small one; uniting to produce this propensity in a degree so violent, that mankind have pronounced it irresistible, except by a countervailing union between strong republican fetters upon government, and a degree of political knowledge in the major class, sufficient to prevent these fetters from being broken by laws. The remedy is so rare, that many honest men doubt of its existence; and have concluded in despair, that the major class or general interest of a nation, must inevitably become the slave of the minor or factitious interest in some mode. Others believe, that by exciting the general interest to watch, to think, and to judge for itself, its intellect will be brightened, and its rights preserved. But all agree that neither any individual nor any interest dictated to by another can prosper; and that political ignorance universally implies political slavery. Election has no power beyond a charter or a commission, to prevent the elected from being transferred by his election from the great class of the general interest, to the little class of factitious or legal interest; on the contrary, the structure of republican government is raised upon the principle, that it necessarily transfers him from one to the other, at least in most instances. This is unanimously admitted by the elected themselves. They separate into two parties, called ins and outs. The ins say that the outs are influenced by a desire to get in, and the outs that the ins are influenced by a desire to keep in. Agreeing that both belong to the minor class, and neither to the major class, which can neither get in nor keep in; these two members of the minor class vote in constant opposition, because they stand in each other's way, which could not possibly happen if they were genuine members of the general interest class. How then can the major class expect happiness from this species of political gambling for a rich stake which it pays, and the gamblers alternately win, if it has no skill in the game?

Agriculture is the most powerful member of the class constituting the general interest, but if her sons are too ignorant to use this power with discretion, (like a body of elephants thrown into confusion in a battle) they rush in every direction, trampling down friends and foes for a short time, and inevitably become an easy prey to their enemies. As the most powerful individual constituting the major class of general interest, the political ignorance of agriculture would of course destroy the rights of the whole class. If she divides herself between any of the members of the inferior class, each of her moieties enlist under an aristocratical or monarchical power; whether it be called executive, legislative, credit or charter, and the member obtaining the victory by her aid, becomes her master. Just as in a division of her forces between a king and a nobility, the king or the nobility, and not agriculture, gains a victory, both over her, and over all her weaker associates in the class of the general interest.

As there are two classes of interest only in society there are also only two political codes, each appropriated by nature to one class. The code of the minor class is constituted of intrigues and stratagems to beguile the major class, and to advance the separate interests of the individuals, parties and legal combinations, of which the minor class is compounded. The code of the major class consists of good moral principles, by which the national rights and happiness can only be preserved. The guilt of offensive war, and the virtue of defensive, are the essential qualities of the respective codes. One is compounded of the best, and the other of the worst qualities of human nature; and the members of the general or natural interest of society can never avoid oppression, nor sustain a just and free government, unless they are skilled in both.

As the extension of comfort and happiness is the

only good motive for writing an agricultural book, whatever would defeat the end belongs to the subject; and as a legal profusion in overstocking a nation with members of the minor class is the solitary process for enslaving it, unless the major class understands the sublime branch of ethics, namely, political morality, it cannot counteract this process. Thus only can it distinguish between laws and projects calculated for benefiting or injuring the nation. This science only can prevent the liberty, the virtue, the happiness, the bravery and the talents of the nation from being extinguished. The treasury of the United States has been cited as a proper subject for its application. If the agricultural and other members of the major class should discern that the president had become a king of the treasury, surrounded with nominal checks and balances appointed by himself; if they should discern that the representatives of the people were convinced of a great waste of public money, and yet ignorant of the modes by which it was effected; if they should recollect the consequences of such an error in the English form of government; and if they knew that nations were enslaved by a corrupting application of their own treasure, would not the correction of the evil be founded in genuine political morality, and be plainly adverse to the erroneous and flagitious political code of the minor class.

The intimate connexion between agriculture and the militia arises from their being both interests belonging to the major or general class of national interest, of such magnitude, that they must live or perish, politically, together; and the rights of the whole class will be lost by the subjection of either. By transferring the power of the purse from agriculture to the

stock-jobbers, or the power of the sword from the militia to a mercenary army, the destruction of a free form of government naturally ensues. This single consequence suffices to refute two hundred thousand artifices, eternally practised by the sundry members of the minor class, to discredit the militia. They might be refuted by a hundred thousand facts. The most eminent periods of Greece and Rome, were inspired by a union between a militia and a considerable degree of political knowledge in the major class. Thermopylae was defended, and Xerxes defeated, by militia. The Roman empire was created and destroyed by militia. England and the Indians have often felt the militia of the United States. Europe was repulsed by the militia of France, and the career of France arrested by the militia of Spain. The pride, the habits and the interest of mercenary armies is however its historiographer, and the hatred of government and parties its patron. These convert its enology into a crime. "It is unfit" say they, "for the execution of the projects of statesman, and hence diminishes the energy of the government." But it is the best security against foreign conquest, and the only security against domestic oppression from a combination among the members of the minor interest; nor will any project plainly calculated to advance the happiness or secure the liberty of the general interest ever fail of finding a complete security in the power of a militia, organized to sustain and not to betray that interest. How often has the zeal, virtue and courage of a militia, burst through the artifices or neglect of the minor interest for suppressing all three, and demonstrated its natural alliance with political morality and national liberty.

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Besides all the discontinuances of subscriptions to the *Farmers' Register* made by the choice and under the proper orders of subscribers, (which, however sorry we may be to receive, are always promptly obeyed,) there are two large classes of names which will be erased from the list for future issues, without the order of the individuals, and no doubt in many cases contrary to their wishes. In all such cases, we have to excuse the reluctant act by reference to the circumstances—and to profess our great willingness to restore the names of such erased subscribers, as soon as, by payment of arrears, or by orders for renewed subscription (according as either of the respective cases may exist,) they will remove the cause of the suspension of our present connexion.

The first class will embrace (as heretofore, and as required by the rules of the Editorial Convention,) subscribers who are indebted for two years or more. We know that this class comprehends very many honorable and correct gentlemen, who, merely from inattention to such small matters, have permitted themselves to be confounded with the never-paying subscribers and patrons who ruin the publishers of periodicals. But we know not how to discriminate, and ought not to discriminate, even if knowing. Every good subscriber so improperly classed will owe it to his own neglect; the effect of which he can at once remedy, and always prevent in future.

Another class of discontinuances without order may much more require apology, inasmuch as it

will embrace subscribers who have fully paid their dues, and in advance, and who may generally desire to continue on the list. These are the new subscribers to the current volume (8th) brought in by other persons, and under the recent rule of joint subscriptions. Though not in any way required by our conditions, we shall suspend most of such names, and await future orders from them for renewal under the new published conditions (for vol. ix.) By this step we may lose many, who, if their names had been suffered to remain, would have continued good and punctual subscribers. But all such may easily, by renewal, repair our error; and even if they neglect to do so, and their future support to this work should be lost, we prefer to sustain the loss of a hundred good subscriptions, rather than retain ten persons who may (however wrongfully) suppose that they were entrapped into a continuance, and under conditions which they did not understand, simply because they would not read or attend to them.

TO CORRESPONDENTS.

The following communications are on hand, and will be published in the next number (1st of vol. ix.)

"Account of the Tuckahoe root"—"Report on the marling of King William county, with answers to general queries &c." "Experiments on the use of crushed bones, as manure."—"Experiments and observations on the use of green-sand as manure"—"Actual results of an experiment in silk-culture in Mathews, Va."

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